Discussion Paper

Energy and Climate Change – Review and Assessment of the National Plan

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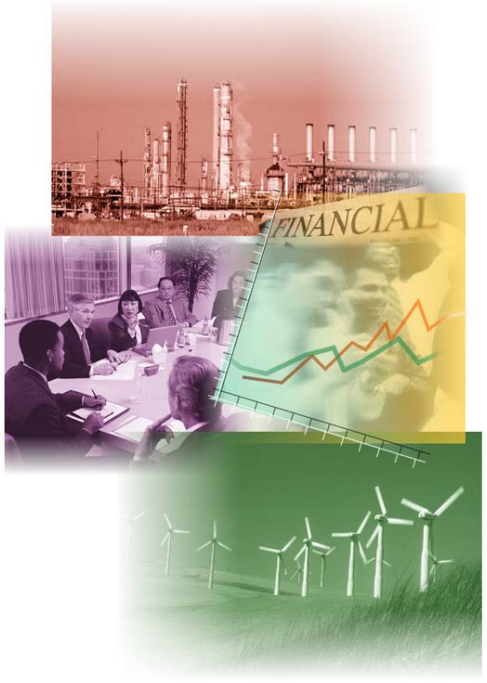

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EXECUTIVE SUMMARY

Canada has committed to reduce its greenhouse gas emissions by 2008 –2012 to 571 million tonnes (MT) per year, as specified by the Kyoto Protocol. Shortly before ratifying the Protocol in December 2002, the Government formulated a plan to meet the target. However, there has been criticism from many quarters that Canada has not provided an effective or efficient approach to this goal, and that the current plan will not be successful. In early 2004, the Government reaffirmed its goal to "meet the Kyoto challenge" and announced its intention to develop a new equitable plan.
Canadian GHG emissions in 2001 were 18.5% above the level of 1990, compared to 2.3% below 1990 in the EU and 5.2% above the 1990 level in Japan. Canada now has the greatest distance to target among all countries with emission reduction obligations under the Kyoto Protocol.

Canada also has a special challenge because of its complex division of powers to regulate emissions. Emissions are unevenly distributed among the provinces, and the costs of emission reduction also vary highly by province. In Canada, therefore, climate change politics is about regional equity and inter-government relations as much as it is about national costs and benefits. The development of a national plan has been impeded by constant tension among federal and provincial governments.

Reasons for Canada's energy-related emissions growth vary by sector. Energy-related emission grew by 1.9% per year between 1990 and 2001 but would have to fall by an average of 2.3% per year from 2001 to reach a pro-rata share of the Kyoto target. The base against which this would have to occur includes an expected GDP growth rate of 2% per year or more, together with growing oil and gas exports. This implies a decrease of over 4.5% per year in emissions intensity, or emissions per dollar of GDP. The only comparable event in Canadian history occurred in the wake of the Oil Crisis of the 1970's. During the period of greatest consumer energy price increases in Canadian history, 1979 to 1984, emissions intensity only decreased by 3.3% per year.

The implication is that, absent a major policy shock, Canada will need to purchase ten to fifteen times more international emission credit than the 10 MT currently contemplated. For example, even if domestic emissions were stabilized at the 2001 level of 720 MT throughout the 2008-12 period − a plausible goal requiring strong policy − Canada would have to purchase 149 MT of international credits, equal to 62% of Canada's estimated "Kyoto Gap" of 240 MT . Whether or not these international credit amounts will be available or how much they will cost are both unknown.

Fossil fuel and electricity production represent almost half of total energy-related emissions. These markets are subject to large multi-year or decadal shifts in terms of market shares, production levels, resource costs and fuel choice, all of which have large effects on emissions. Any climate change plan with a target must be able to adapt the intensity and scope of its activities as energy markets unfold. For example, the expected natural gas price in North America has risen dramatically in the last three years. The price increase is expected to increase the market share of both coal-fired electricity and nuclear and renewable electricity, for an indeterminate effect on emissions, perhaps +/- 20 MT of GHG.

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To date, the national plan for climate change mitigation may be viewed in three stages. The first stage focused on improving the information base, on modest expansions of existing energy efficiency programs and on voluntary action. The first stage lasted from the signing of the UN Framework Convention on Climate Change (UN FCCC) in 1992 until the signing of the Kyoto Protocol in December 1997. The second stage, from early 1998 to late 2002, was based on meeting the commitment of the Protocol. The second stage culminated in November 2002, just prior to ratification by Canada, with the first national plan to address the full emission reduction obligation under the Protocol. The third stage is on-going. It includes implementation of elements of the November 2002 Climate Change Plan for Canada (CCPC), as well as uncertainties regarding entry into force of the Kyoto Protocol and potential re-working of the plan by the federal government.

Approximately $3.7 billion in federal government expenditure, in addition to provincial and municipal amounts, have been committed to climate change programs so far. The amounts are implicitly contained in the CCPC, which represents the culmination of efforts to date. However, the CCPC does not provide the basic information that is necessary to conduct an assessment of its emission reduction activities. There is no description of how emission reduction estimates were made. Measures described as "actions underway" are not linked in any traceable way to programs and activities in previous plans. Several of the emission reduction estimates appear unduly optimistic.

In the CCPC, there are many targeted measures but they tend to be small and have high administrative costs and restrictive requirements, for an overall low expected efficacy. There is too much reliance on information, suasion and voluntary action for a mature plan oriented to the 2008-12 period. There are additional problems around sharing GHG emission reduction credit with other participants in emission reduction activities. Finally, the CCPC includes as "actions underway" several major investments and activities that are speculative.

Although the CCPC has seen some success with respect to implementation of the domestic emission trading system for industry, on balance the CCPC can be expected to fall well short of its intended target.

The key lesson is the need for buy-in at highest political level for the changes that are necessary. In Canada, the high-level abstract political debate over the target has not been followed by high-level practical negotiations around the plan to achieve it. As a result, Canada's plan has not adequately addressed the root cause of growing emissions, namely the persistence and continued growth of long-lived capital stock that is carbon-inefficient. The plan must replace this stock with low-emitting energy technologies and with energy-efficient equipment, buildings and vehicles. While some of the CCPC measures do address stock replacement, at least directionally, the economic forces that govern production and investment in energy-related areas overwhelm the types of suasion, rules and incentives that have been developed so far.

Some potential improvements include the following:

1. Embed GHG emission reductions in a sustainable development framework

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Under a sustainable development framework, the climate change plan would limit itself to activities where GHG reduction is an important driver. Activities where GHG reduction is only a positive side-effect would be implemented by other plans within the framework.

2. Commit to measures up front and for enough time to effect the necessary changes

   Investors need long-term economic signals in order to affect the turnover of long-lived capital stock in energy using and energy producing sectors. Measures that affect stock turnover must improve return on investment calculations for equipment that can last decades.

3. Concentrate on commercial markets, not economic theory

   Economic analysis cannot properly reflect the multi-dimensional choices that people and companies make. New technologies require greater incentives than suggested by economic models because capital markets demand high premiums for taking risks in early commercial applications.

4. Fund or incentivize above thresholds

   The political need to distribute benefits equitably among regions and sectors has produced an abundance of small programs with small incentives and high administrative requirements. The effectiveness may be reduced because of the high proportion of free-riders and the costs of administration.

5. Make appropriate use of the international market for GHG emissions reductions

   A robust international market for greenhouse gases is needed to reinforce and supplement domestic policies. Any new plan for Canada must recognize now the need for significant Canadian purchases in the market.

6. In the domestic emission trading market, limit government to market creation and regulation, not operation

   Government is in a potential conflict when it is both a regulator and a market player. The mechanisms of emission trading can be handled efficiently by emitters and by private brokerage and trading firms.

7. Help new technologies through the “valley of death”

   The “valley of death” refers to the first commercial application of a new technology. Investors strongly resist being first in, while the government tends to avoid “picking winners”. The result is a key barrier to international competitiveness in sustainable development technologies.

8. Start at the top and with the big picture: build trust and reduce uncertainty through consecutive negotiations and agreements at increasing levels of detail and decreasing levels of seniority

   Decision-makers cannot be expected to make informed decisions about specifics without having previously decided on generalities. A top-down approach starts with Cabinet-level discussions and federal-provincial negotiations. Politicians

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would be more likely to follow through once they see how specific programs proposed by the departments reflect the discussions and negotiations.

9. Think big and long term, but act now

   The core of the plan has to be accelerating capital stock turnover towards more sustainable technologies. This is a long-term proposition that involves some of the most enduring and expensive pieces of infrastructure that exist. Steady and substantial pressure over time is required to influence the relevant decisions. Such an approach has to start now in order for the decisions to have a substantial effect on emissions over the next decade.

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1 Introduction

As a signatory to the Kyoto Protocol, Canada has committed to reduce its greenhouse gas emissions to a fixed level by 2008 –2012, which implies a 30% reduction in greenhouse gas emissions. Shortly before ratifying the Kyoto Protocol in December 2002, the Government formulated a framework for action on closing the corresponding forecast 240 MT Kyoto gap in 2010.

However, there has been criticism from many quarters that Canada has not provided an effective or efficient approach to this goal, and that the current plan will not be successful. In early 2004, the Government has reaffirmed its goal to "meet the Kyoto challenge" and announced its intention to develop a new equitable plan. Therefore, further concern has been raised on the lack of time to develop the new plan and yet achieve the Kyoto target in due time.

Given that energy accounts for 85% of climate change emissions, Canada will have to develop positions that integrate longer-term climate change challenges with energy and economic realities in order to conceive an effective approach to address climate change.

The present paper intends to help build an integrated and effective approach to energy and climate change in Canada, by assessing the energy-related portions of the Canada's climate change mitigation activities and plans. Section 2 describes the history of Canadian climate change policy In Section 3, the paper describes Canada's energy-related emissions performance and outlook, taking into consideration domestic energy use issues and increases in energy exports. Section 4 compares Canada's performance to other countries, which reveals that Canada is not alone in struggling to meet its Kyoto target. Section 5 discusses the sensitivity of emissions projections to changes in energy markets and identifies the need for a plan that is robust against these changes.

Canada's climate change activities to date are briefly assessed in Section 6. Section 7 summarizes some lessons learned in the analysis, while Section 8 describes potential improvements relating to Canada's plan to reduce energy-related GHG emissions.

2 International and Canadian context

International Context

Canada signed the United Nations Framework Convention on Climate Change (UNFCCC or the Convention) in 1992. The Convention was ratified by more than 100 countries[1], including Canada, and came into force on March 21, 1994. Industrialized nations, including countries with economies in transition[2], committed to reporting on actions taken toward the goal of stabilizing greenhouse gas emissions at 1990 levels by 2000 as a first step towards the Convention's utmost objective of stabilizing greenhouse gas (GHG) concentrations in the atmosphere at a level that would prevent dangerous anthropogenic interference with the climate system.

The Parties to the Convention judged that initial efforts were not sufficient and, in 1995, they began negotiations for a binding agreement to set targets for the post-2000 era. In December 1997, ministers and other high-level officials from 160 countries met in Kyoto, Japan, for the Third Conference of Parties (CoP3) to the Convention and agreed to the Kyoto Protocol. Canada signed the Kyoto Protocol in April 1998, and ratified it in December 2002.

Under the Protocol, industrialized countries must reduce their collective GHG emissions by 5.2% by the period 2008 to 2012. Canada's commitment requires reductions to 6% below the level recorded in 1990 by the same period. These reduction obligations may be met, in part, by acquiring credits for reductions made in other countries under the Kyoto Mechanism provisions. Since 1997, negotiations have continued to further define the rules and guidelines under the Protocol, and to set the framework for decisions by Parties on ratification.

Unlike the UNFCCC, however, the Kyoto Protocol has yet to enter into force. The United States, which accounted for 36% of the total GHG emissions in 1990, has renounced the Protocol, and under the Protocol's provisions, entry into force can only now occur if the Russian Federation ratifies the deal[3].

[1] As of February 2004, 188 countries are now Parties to the UNFCCC.

[2] Former Soviet Union and eastern bloc countries that were undergoing a shift from a centrally planned to a market based economy.

[3] In order to come into effect, the Protocol must be ratified by at least 55 countries, including developed countries (Annex I) that have collectively released 55% of the total GHG emissions in 1990 from the developed world. The first requirement has been fulfilled in May 2001. However, as of March 2004 only 44.2% of the total 1990 GHG emissions are represented.

National Context

Among countries with emission reduction obligations, Canada has a special challenge. The development of a national plan has been impeded by constant tension among federal and provincial governments, which arises from the gray area surrounding division of powers. Environment is a shared responsibility. International treaty-making is a federal power, but the Provinces control the natural resources that generate emissions. Further, emissions are unequally distributed among the provinces. For example, BC, Manitoba and Quebec have relatively low emissions, due to their hydroelectric base, while Alberta's emissions are high due to the oil and gas industry and to coal-fired electricity. Costs of emission reduction also vary highly among the provinces – British Columbia is one of the most expensive to reduce emissions, for example. In Canada, therefore, the climate change issue is one of many at play in the field of federal-provincial relations.

The evolution of the national plan described in more detail below therefore reflects a political environment that did not have uniform buy-in from the Provinces and was thus limited in the scope of the measures that could be implemented.

The national plan may be viewed as building in three stages. The first stage focused on improving the information base, on modest expansions of existing efficiency programs and on voluntary action, and lasted from the signing of the UN Framework Convention on Climate Change (UN FCCC) in 1992 until the signing of the Kyoto Protocol in December 1997. The second stage, from early 1998 to late 2002, was based on meeting the commitment of the Protocol. The second stage culminated in the first national plan designed to address the full emission reduction obligation under the Protocol, which was produced in anticipation of Canada's ratification of the Protocol. The third stage is on-going. It includes implementation of elements of the 2002 plan as well as uncertainties regarding entry into force of the Kyoto Protocol and regarding the policies of the federal government. The stages are now described in more detail.

In the first stage, existing programs on energy efficiency, green buildings and renewable energy sources were extended and re-defined as climate change programs. New climate change activities focused on voluntary actions and a few small tax measures and programs. The Measures Working Group and Forecast Working Group of the Climate Change Task Force of the National Air Issues Coordinating Committee generated a large number of emission reduction options and economic impact analyses respectively. Following prolonged federal/provincial/territorial debate, in 1995, governments were able to agree on only a small fraction of these measures. As such, the National Action Plan[4] (1995) relied mostly on voluntary efforts, foremost among which is the Voluntary Challenge and Registry (VCR).

[4] Canada's National Action Program on Climate Change: http://www.ec.gc.ca/climate/resource/cnapcc/indexe.html.

The National Action Plan was reviewed independently (1996) [5]. The Review confirmed that the prospects for achieving emission stabilization in 2000 were remote. The Review pointed out the weaknesses of a primarily voluntary approach and the decline in renewable energy funding. The Review also concluded that, with respect to reporting "there is no standardized format, few quantified measures, little budgetary information, and a uniform propensity to report activity rather than intended results."[6] This applies to the Plan document itself, to the VCR and to several lists of federal and provincial programs, which varied widely in terms of what was defined as climate-related as well in terms of the reported details of the programs.

In 1996 and 1997, new, small domestic programs were implemented, such as tax flow-through eligibility for certain wind power development expenses. However, by then the government's focus shifted to international negotiations. Consistent with the developing international framework, there was work done on Canada's national inventory to improve estimates for non-CO_2 gases, carbon sinks and upstream emissions. Emissions trading emerged both nationally and internationally and became a prominent feature of the Kyoto Protocol. In Canada, leading up to Kyoto there was an abstract political debate concerning the GDP and employment impacts of GHG reduction targets and financial instruments to achieve them. There was less importance attached to on-the-ground analysis of how to achieve a target or even what level of target was practically achievable.

In December 1997, the Kyoto Protocol crystallized a target and the scope of the mitigation requirement. The policy intent shifted from "if" to "how". Environment and Energy Ministers[7] established the National Climate Change Process (NCCP) in 1998 to examine the impact, costs and benefits of implementing the Kyoto Protocol and the various implementation options open to Canada. That process involved two years of extensive consultations ("Tables") with 450 representatives from industry, non-governmental organizations, citizens, governments, and academics. The NCCP generated a great deal of research such as GHG emission reduction supply curves, analysis of measures and technology plans, through an "options" process. The analysis was aggregated in an economic modeling exercise, which was in turn reported in Nov 2000.[8] While the NCCP yielded a great deal of information, there were few agreements of any kind that could be put into operation. The individual policy options were never coalesced into an integrated proposal for stakeholders to buy into. There was also little incentive for stakeholders to buy into an integrated proposal because politics formed a barrier to implementation of most of the potential "building-block" measures.

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[5] Reviewing the Progress Made Under Canada's National Action Program On Climate Change; RFI, Torrie Smith Associates and Policy Assessment Corporation, November 19, 1996

[6] Ref note 5, p 8 – 3.

[7] Except Ontario, according to Canada's National Climate Change Process: http://www.nccp.ca .

[8] Analysis and Modeling Group (AMG), 2000, An Assessment of the Economic and Environmental Implications for Canada of the Kyoto Protocol: http://www.nccp.ca/NCCP/pdf/AMG_finalreport_eng.pdf.

After two years of working with the issues tables, the federal, provincial, and territorial governments agreed to adopt the National Implementation Strategy on Climate Change (NIS). Under the NIS, the federal and all provincial and territorial governments are required to demonstrate, through annually updated three-year business plans, how they are taking action. The first series of those actions is outlined in the First National Business Plan (FNBP) (2000/01-2002/03), which is a compendium of over 300 federal/provincial and territorial government actions and measures (as well as private sector activities that do not appear to depend on government support).. There is no clear link between the work products of the NCCP and the actions included or announced in the FNBP. For example, the FNBP does not rationalize its "actions under consideration" on the basis of emission reduction costs analysed in the NCCP.

Action Plan 2000[9] reflects the Government of Canada's contribution to the FNBP and includes an intention to invest up to $500 million on specific actions to reduce GHG emissions. The five-year plan proposes annual emission reductions of about 65 MT.

Internationally, Canada sought and obtained Kyoto Gap concessions (CoP7, November 2001) . There was extensive study of the Kyoto Mechanisms. Canada invested in the development of capacity in developing countries to create, certify and implement Clean Development Mechanism projects. Domestic burden-sharing issues were addressed for the first time by two working groups on Emission Allocation and Burden Sharing and on Domestic Emissions Trading These latter of these laid the foundations for the Large Final Emitters (LFE) Domestic Emissions Trading (DET) System.

In 2002, amid the Canadian political debate around Kyoto ratification, a national plan was defined, for the first time, in terms of closing the expected 240 million tonne (MT) gap between business-as-usual emissions and the Kyoto target. The Climate Change Plan for Canada (CCPC) of November 2002 divides the Kyoto Gap into sectoral responsibilities and defined three phases as described below. It includes on-going programs and initiatives, and goals for undefined programs, for international credit purchases, and for activities yet to come. The plan incorporates the fleet of programs developed to date, and served as the policy basis for ratification and the $2 billion announcement in the 2003 federal budget.

The CCPC presents a three phased approach: 80 MT from actions underway (Phase I), 100 MT from new actions (Phase II), and a remaining 60 MT of unspecified action (Phase III). Phase I actions include initiatives from Action Plan 2000, the Federal Budget 2001 and prior programs. Phase II identifies three programs for achieving 100 MT of reductions within the main sectors of the economy. The program for large industrial point sources is designed to achieve 55 MT of GHG reductions by requiring an average 15% emission intensity reduction from Large Final Emitters (LFE)[10]. This will be

[9] Action Plan 2000 on Climate Change: http://www.climatechange.gc.ca/english/whats_new/pdf/gofcdaplan_eng2.pdf.

[10] Large Final Emitters represent about 40% of Canada's emissions and come from 9 sectors of the economy including transportation; housing and commercial/institutional buildings; agriculture, land use change and forestry; and small and medium-sized enterprises.

accomplished through covenants with government, with a regulated target for those industries without covenants. In conjunction with intensity reduction commitments, the Plan proposes the development of a domestic emissions trading (DET) system, consistent with international emission trading rules under the Kyoto Protocol.[11] There may also be a domestic offsets system that would generate credits from emission reduction projects in non-LFE sectors that could be traded domestically or internationally. The credits available under a domestic offset system would not reduce Canada's emissions unless retired by the buyer. More likely, the credits would be converted into emission permits and used to emit as many tonnes as credited.

Also within Phase II, Targeted Measures and Partnership Funds are intended to yield another 35 MT of reductions in non-LFE sectors. Targeted measures might include production subsidies, tax incentives, and efficiency regulation for automobiles and appliances. Partnership funding will involve matching funding from the Federal Government to cost-share emission reductions in areas such as energy efficiency. The last element in the Government's Plan for Phase II is to purchase at least 10 MT international credits under the Kyoto Protocol. These international credits would reduce national emissions for the purposes of compliance with the Kyoto Protocol.

Further potential actions were mentioned for the remaining 60 MT scheduled for Phase III, including emissions reductions from existing and future technology R&D investments; potential credit for clean energy exports; and other provincial, territorial, and community initiatives. However, no firm measures have yet been proposed for this Phase.

The 2003 Budget promises $2 billion over five years to implement the CCPC, bringing Canada's total investment since Budget 2000 (inclusive) to $3.7 billion.

Since the CCPC, there has been some progress on the LFE DET system. This includes analysis of potential reduction obligations, together with one agreement with the Forest Products Association of Canada, and one agreement with DuPont Canada. Industry was granted its request for targets in terms of emission intensities, rather than a "hard" cap, and the federal government agreed to cap the emission permit price at $15/tonne. However, negotiations of individual covenants slowed, despite ratification of the Kyoto Protocol, in anticipation of a changeover in governing party leadership and in light of continued uncertainty regarding Russian ratification.

Since late 2003, the legislative structure of the covenant/backstop regime has been further advanced, including more details on coverage and allocation of permits. Principles for the

[11] The EU is in the process of passing laws necessary to incorporate international credits under the Kyoto Mechanisms in its emission trading system scheduled for 2005. [e.g. Directive 2003/87/Ec Of The European Parliament And Of The Council of 13 October 2003 establishing a scheme for greenhouse gas emission allowance trading within the Community and amending Council Directive 96/61/EC

http://europa.eu.int/eur-lex/pri/en/oj/dat/2003/l_275/l_27520031025en00320046.pdf; Article 25]

permit market were agreed with key stakeholders and design elements of the domestic offset system and principles for recognizing early action have been posted for comment.

In early 2004, the federal government restated Canada's Kyoto commitment in its Throne Speech and announced its intention to develop a new equitable climate change plan, with a focus on the development and introduction of new technologies. Consensus on the need for a one-window reporting system of GHG emissions was reached and in March 2004 the federal government announced mandatory emissions reporting for large emitters.

3 Energy-related emissions and the Kyoto Target

Canada's total greenhouse gas emissions in 2001 were 18.5% above 1990's level of 608 MT, and 149MT above the Kyoto target of 571 MT[12]. The average annual growth of emissions over the 1990–2001 period was 1.6%[13].

Emissions have grown largely as a result of an increase in fossil fuel consumption in power generation, increased energy consumed in transport and high growth in fossil fuel production, largely to service greater export demand. Emissions from electricity and heat generation have increased 44% and those from transportation 22%.

The growth in output for the economy as a whole was accompanied by less significant growth in GHG emissions due to a move away from GHG-intensive fossil fuels in industrial, residential and commercial sectors and to gains in energy efficiency in smelting and refining industries and in the chemical industry.

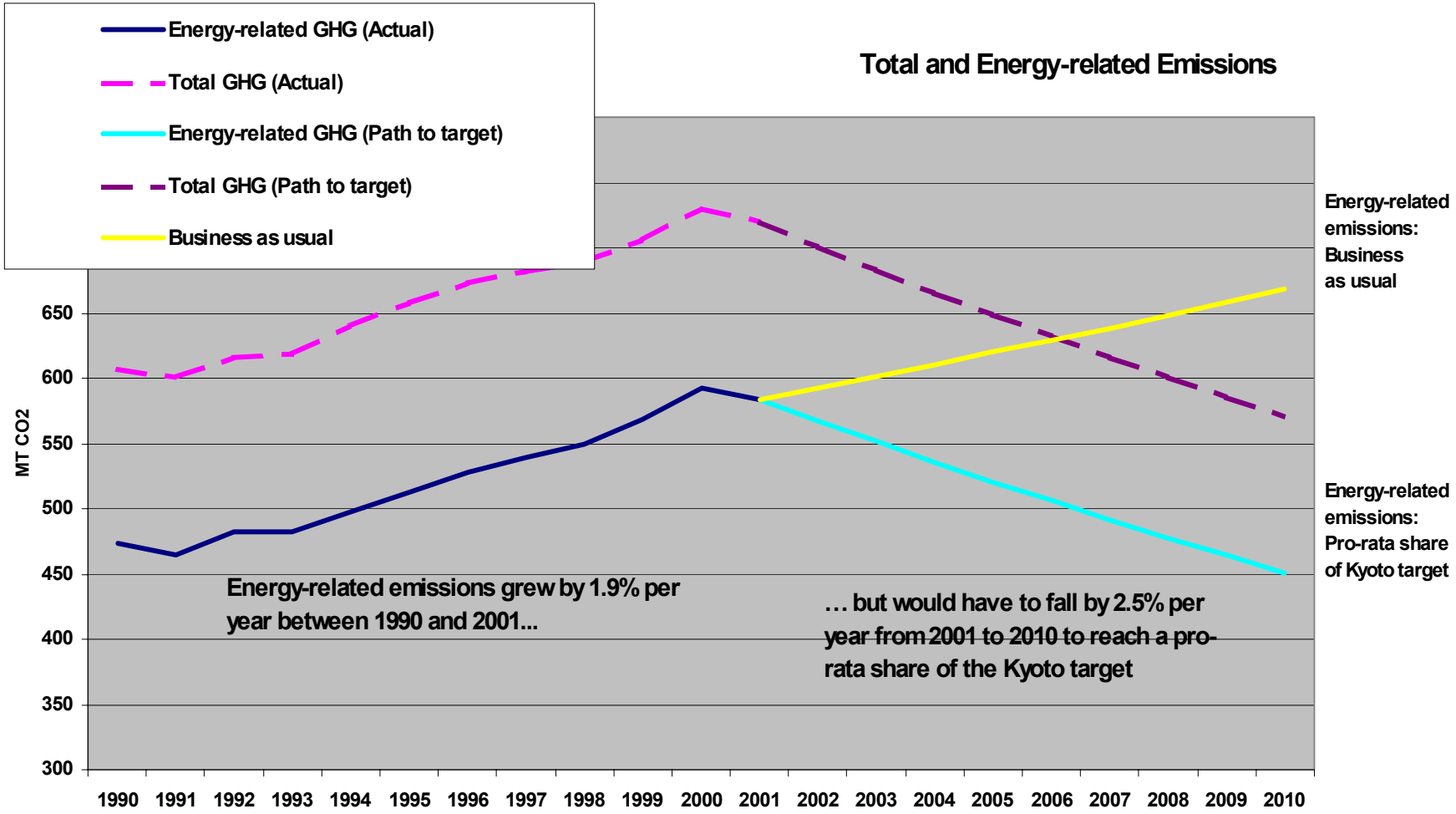
Chart 1 shows Canada's energy-related greenhouse gas emissions since 1990, compared to the Kyoto target and to a business-as-usual (BAU) projection for 2010.[14] Energy-related greenhouse gas emissions are approximately 80% of total emissions. Within energy-related emissions in 2001, fossil fuel production accounted for 21% and electricity generation 23%. Transportation fuels contributed 32%, manufacturing 11% and commercial and residential sectors 13%.

[12] Environment Canada, 2003, *Canada's Greenhouse Gas Inventory 1990-2001*: http://www.ec.gc.ca/pdb/ghg/1990_01_report/foreword_e.cfm.

[13] Emission growth peaked in 1994 at over 3.5% per year and fell consistently thereafter until 1999 and 2000, when emissions rose 2.4% and 3.4% respectively. Emissions fell slightly in 2001 due to economic recession and September 11 effects.

[14] Sources: *Canada's Greenhouse Gas Inventory 1990-2001* Environment Canada; Emissions *Outlook Update*, Natural Resources Canada, December 1999

CHART 1



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The Chart shows the wide divergence between historic trend and trajectory to target.[15] Energy-related GHG emissions have grown almost 2% per year since 1990.[16]

Domestic energy use: Different rates of emission growth apply to different sectors. Among the end-use sectors (Industry, Transportation, Residential and Commercial), there are complicated and interacting effects. For example, vehicles have become more efficient for a given size, but the increased penetration of light trucks and sport utility vehicles (SUV), more cars and greater travel per car increased road transportation emissions by 25% over the 1990 – 2001 period. By contrast, residential emissions stayed nearly constant, fluctuating with weather. Space heating efficiency increased due to more efficient gas furnaces and better-insulated new housing stock, which offset growing demand for space heat.

The effect of climate change policies and voluntary actions are also becoming evident. For example, industrial emissions fell by 10 MT due to the voluntary elimination of nitrous oxide emissions from a single plant.[17] But an additional 35 MT were emitted in "Other manufacturing" due to increases in activity in that heterogeneous sector.[18]

Detailed analysis of energy trends by fuel and sector is complicated, but an overall trend has been established: energy use grows slower than real GDP and faster than population. For example, from 1990 – 2001 the figures were 1.5% for energy use, 2.7% for real GDP and 1.1% for population. The pattern has been in effect since the mid 1980's, when the shift to a service economy caused energy use to grow slower than GDP for the first time.

Emissions per unit of energy use vary substantially between oil products, natural gas and coal. However, the market shares of oil, natural gas and coal used in Canada have changed relatively slowly[19], so emissions per unit of energy are relatively unchanged

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[15] The 8.7 MT downturn in emissions between 2000 and 2001 was mainly due to a warmer than average winter, reduced energy use in some industrial sectors and declines in fuel consumption (e.g. air travel) following September 11. It should not be viewed as signaling a change in trend

[16] Environment Canada, 2003, *Canada's Greenhouse Gas Inventory 1990-2001*: http://www.ec.gc.ca/pdb/ghg/1990_01_report/foreword_e.cfm. Between 1990 and 2001, non-energy-related GHG emissions, representing approximately 20% of Canada's inventory, rose by 7.5% to mid-decade and then fell to 1990 levels

[17] Environment Canada, 2003, *Canada's Greenhouse Gas Inventory 1990-2001*, Chapter 2, Table 2-5: GHG Emissions from Industrial Sources 2001: http://www.ec.gc.ca/pdb/ghg/1990_01_report/p2_e.cfm#t12 The contribution is recognized in an MOU signed by Canada and Dupont in Nov 2003 [http://www.nrcan-rncan.gc.ca/lfeg-ggef/English/MOUDupont_en.pdf]

[18] Environment Canada, 2003, *Canada's Greenhouse Gas Inventory 1990-2001*, Annex 8, TableA8- 1: Industrial GHG Emissions by Fuel Combustion, Process and Fugitive Sources for 1990, 2000 and 2001: http://www.ec.gc.ca/pdb/ghg/1990_01_report/annex8_e.cfm#t51. Note that emission intensity fell by 23%, likely reflecting more a change in industry composition than climate-change-related efforts.

[19] For example, between 1990 –98 the market shares of oil gas and coal changed at most 2 percentage points. *Energy in Canada 2000*; Natural Resources Canada Series 3.01. Total GHG emissions per unit energy varies approximately 3% or less from year to year.

over time.[20] Thus it can be expected that emissions from energy use will, like energy use itself, tend to grow faster than population but slower than GDP.

While the relationships among the size of the economy, energy use and energy-related emissions are not fixed, the record shows that the relationships change relatively slowly for the time at hand. The machinery of energy supply is costly, physically large and turns over slowly, and there are practical limits to market penetration rates of renewable and nuclear capacity. Consistent efforts at demand-side management (DSM) have shown that energy use per unit of consumer activity can be reduced, but not to the point of eliminating growth in demand. For example, Canadian electricity utilities with DSM programs since the 1980's and early 1990's have typically saved 5 – 6% of demand, equivalent to 3-4 years of load growth, [21] and in the U.S., estimated total utility DSM savings peaked in 1996 at about 2% of demand.[22]

Energy export-related emissions: Energy-related emissions include those related to oil and gas exports, where upstream emissions from extraction, upgrading and processing accrue to Canada. While domestic energy use and emissions related to it are tracking under GDP, Canadian oil and gas exports have grown faster, as have their upstream emissions. Total energy exports increased 136% between 1990 and 2001 and emissions associated with those exports grew 146%. Although emissions related to oil and gas exports are only about 10% of total energy-related emissions, this component of the inventory is expected to increase rapidly over the coming years. Canada has repeatedly sought recognition of this situation in the international negotiations on climate change but has been consistently rebuffed.

The Kyoto target: The above discussion suggests that only an unprecedented change in policy would enable Canada to so strongly decouple energy, energy-related emissions and economic growth as to *reduce* its energy-related emissions by over 2.5% per year over a period of six years. The base against which this would have to occur includes an expected GDP growth rate of 2% per year or more and growing oil and gas exports. The closest to this kind of decoupling – an implied decrease of over 4.5% per year in emission intensity − occurred in the wake of the Oil Crisis of the 1970's. During the period of greatest consumer energy price increases in Canadian history, 1979 to 1984, greenhouse gas emissions per dollar of GDP decreased by 3.3% per year. During this period, the all-energy price to consumers rose each year by an average of 6.3% faster than inflation. At the same time there were a number of conservation and oil-to-gas conversion programs, which contributed to a less carbon-intensive economy.[23] By way of illustration, a 6.3% real per annum price increase, if applied to gasoline, would raise prices from today's

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[20] Environment Canada, 2003, *Canada's Greenhouse Gas Inventory 1990-2001*, Executive Summary, Table S-2: Canada's GHG Emission Trends by Sector and Table S-3: Canada's GHG Emissions and Accompanying Variables, 1990-2001: http://www.ec.gc.ca/pdb/ghg/1990_01_report/executive_e.cfm#t3.

[21] *Bird's Eye View of Electricity Supply and Demand to 2020*, Canadian Electricity Association, GCSI Inc July 2001, p. 7.

[22] US. Energy Information Administration, 2003, Annual *Energy Review 2002,*Table 8.9:Electric Utility Demand-Side Management Programs, 1989-2001: http://www.eia.doe.gov/emeu/aer/elect.html.

[23] David Suzuki Foundation, 1997, *The Role of Government*, p.21: http://www.davidsuzuki.org/files/Margolick_full.pdf.

Canada-wide average of about 70 cents/litre, to $1.14/litre in 2012, expressed in 2004 dollars. This might be achieved by raising taxes on gasoline by 5.5 cents/litre each year. Other measures would be required for other sectors and fuels, including electricity generation and natural gas.

In the absence of policies such as these, realization of the Kyoto target will require a very high level of international emission credit purchases. By way of illustration, if total GHG emissions growth were constrained to 1% per year until 2010, there would have to be international credit purchases of 216 MT in that year in order to close the Kyoto Gap. Stabilizing emissions at 2001's level would require 149 MT of international credit purchases. Whether or not these amounts will be available or how much they will cost, are both unknown. Canada will need to be a significant international credit buyer together with most other OECD countries other than the UK. The November 2002 Climate Change Plan for Canada proposes a minimum of 10 MT of international credit purchases. A more realistic number if Canada is serious in closing the Kyoto gap would be purchases an order of magnitude higher.

4 Comparison to other countries

Canada is not alone in failing to be on track to meet its Kyoto target. Table 1 shows the distance to target for all the Western countries with binding emission reduction obligations and that that have ratified the Protocol, as well as for India and China, which have no emission reduction commitments[24]. Ten EU countries (Austria, Belgium, Denmark, Finland, Greece, Ireland, Italy, the Netherlands, Portugal and Spain) are not on track to meet their national emission targets. For Kyoto compliance purposes, the important target for each EU country is the target that each had agreed to under their collective burden sharing agreement. The European Emission Trading System is scheduled to enter into effect in 2005, which implies that EU countries running over target will be able to buy permits from those that have met their targets. Emissions allowances are now being negotiated in each EU country.

In proportional terms, Canada is the furthest above its target, although the EU, Japan and New Zealand appear unlikely to make their targets without extensive international credit purchases as well.

Total EU GHG emissions declined by 4% between 1990 and 1999[25]. This was due in large part to two events unrelated to climate change policy: the UK's power sector switch from coal to natural gas; and the reunification of Germany, which resulted in the shutdown of old inefficient industry in the East. The trend in reduced emissions that occurred during the 1990s has recently changed. EU GHG emissions in 2002 were 0.3% above those in 1999. The European Environmental Agency (EEA) attributes the increase to more coal being used in the power sector and more economic growth and predicts that the trend will continue[26]. Rapidly increasing emissions from the transport sector, which presently emits over 20% of the EU's GHGs, are offsetting previous reductions in power generation and industry. According to the latest projections from EEA, ongoing domestic policies and measures at EU and national level will reduce the EU's total emissions in 2010 to only 0.5 % below 1990 levels. There are, however, additional domestic policies and measures being planned in 11 Member States, mainly in the energy sector, that could further reduce emissions in about 6.7 % by 2020. This would leave the EU only 1.8 % short of its Kyoto target[27].

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[24] The "Kyoto target" for European Countries is the target negotiated within the EU countries as part of their collective burden sharing approach as a regional economic integration organization party to the UNFCCC.

[25] See European Environment Agency (EEA), 2001, Technical report No 60, *Annual European Community Greenhouse Gas Inventory 1990-1999*. http://reports.eea.eu.int/Technical_report_No_60/en/.

[26] See European Environment Agency (EEA), 2002, Technical report No 75, *Annual European Community Greenhouse Gas Inventory 1990-2000 and Inventory Report 2002.*
http://reports.eea.eu.int/technical_report_2002_75/en

[27] See European Environment Agency (EEA), 2003, Environmental Issue Report No 36, *Greenhouse gas emission trends and projections in Europe 2003*.
http://reports.eea.eu.int/environmental_issue_report_2003_36/en/tab_content_RLR.

Table 1 - Remaining Kyoto Gap

Country	Kyoto target over 1990's levels	Emissions in 2001 (over 1990's levels)*	Difference to the target
Austria	-13.0%	4.8%	17.8%
Belgium	-7.5%	0.2%	7.7%
Denmark	-21.0%	1.8%	22.8%
Finland	0.0%	4.7%	4.7%
France	0.0%	0.4%	0.4%
Germany	-21.0%	-18.3%	2.7%
Greece	25.0%	23.5%	-1.5%
Ireland	13.0%	31.1%	18.1%
Italy	-6.5%	7.1%	13.6%
Luxemburg	-28.0%	-44.2%	-16.2%
The Netherlands	-6.0%	4.1%	10.1%
Portugal	27.0%	36.4%	9.4%
Spain	15.0%	32.1%	17.1%
Sweden	4.0%	-3.3%	-7.3%
UK	-12.5%	-12.0%	0.5%
Total EU	-8.0%	-2.3%	5.7%
Canada	-6.0%	18.4%	24.4%
Japan	-6.0%	5.2%	11.2%
New Zealand	0.0%	20.0%	20.0%
India	N/A	63%	63%
China	N/A	37.8%	37.8%

* New Zealand, India and China: 1990-2000

Japan faces significant challenges in meeting the country's target because the economy is already highly energy-efficient. Emissions rose 7% from 1990 to 1995, but fell to 5% above 1990's level in 2001, largely reflecting the stagnant economy in the latter half of the 1990's. The government's short-term target is to achieve one-tenth of its reduction by introducing innovative technologies such as automobile weight reduction, power generation efficiency and energy-efficient chemical and metallurgical processes. Japan also has an aggressive R & D programs in "next-generation" technologies such as photovoltaic roof cladding and hydrogen separation membranes. Approximately 40 industrial sectors have made voluntary commitments, primarily to intensity targets such as a 20% reduction in CO_2 intensity in electricity generation. .

The scope of the global climate change issue is starkly illustrated by statistics from China and India, which are growing rapidly and do not have emission reduction commitments.

Although China's emission intensities are falling rapidly[28], the effects of economic development are overriding. Energy-related CO_2 in China grew from 2.2 billion tonnes in 1990[29] to 3.0 billion tonnes in 2000[30]. For example, from 1990 to 2001, China's GDP grew by about 9 % annually and demand for electricity grew over 80%. But close to 30% of Chinese households are not connected to electrical grids and per capita electricity consumption is less than 10% of the US rate. [31] Even at today's population, Chinese electricity demand would equal that of the whole world today if Chinese per capita electricity consumption reached 80% of today's US rate. Similar stories can be told for transportation and other energy uses. For example, Chinese Car sales during the first five months of 2002, for example, were up nearly 40 % from 2001.[32]

China is both the world's largest coal consumer and producer. Coal accounts for more than 66% of primary energy production.[33] Future growth will continue to rely on fossil fuels, particularly coal, because of its abundance and low cost, and because the infrastructure for its use as an energy source is well developed. China is projected to experience the largest absolute growth in carbon dioxide emissions between now and the year 2020.[34]

Reductions in emission in China have been achieved through energy efficiency improvements, fuel switching from coal to natural gas, and afforestation[35]. Continued policies for economic reform, efficiency, and environmental protection could provide further reductions. As well as China's recent overture to foreign investment in the coal sector, particularly in the development of new technologies only recently introduced in China or with environmental benefit, including coal liquefaction, coal bed methane production, and slurry pipeline transportation projects may yield further reductions.

India is experiencing energy growth that matches or exceeds GDP growth. During the 1990's India's economy grew at a rate of almost 6.6% per year, while demand for energy

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[28] See Chandler et al., 2002, "Climate Change Mitigation in Developing Countries: Brazil, China, India, Mexico, South Africa, Turkey," Pew Center on Global Climate Change, Arlington, VA, USA: http://www.pewclimate.org/docUploads/dev%5Fmitigation%2Epdf. China's energy intensity declined approximately 60 % between 1977 and 1997, an average of 4 % a year.

[29] Reinstein, B. (2003) "Global Climate & Energy Report No. 218," Reinstein & Associates International, Rockville, Maryland, USA.

[30] China Coal Institute, 2003. Also, the U.S. Energy Information Administration estimated 3,050 MtCO2e of energy-related emissions in 2001.

[31] US DOE, Energy Information Administration, 2003, *International Energy Annual 2001*, Table 6.2 World Total Net Electricity Consumption, 1980-2001: http://www.eia.doe.gov/pub/international/iealf/table62.xls.

[32] Chandler et al., 2002, p. 14. *Op cit*.

[33] 2003 China Energy Development Report, Metering Publishing House.

[34] U.S. Energy Information Administration: China Country Analysis Brief 2003: http://www.eia.doe.gov/emeu/cabs/china.html.

[35] Chandler *et al.,* 2002. *Op cit*.

grew at a rate close to 7% and demand for electricity has grown even faster, on the order of 8 % per year.

In 1990, India's carbon emissions accounted for 1,000 MT CO2e, accounting for about three per cent of the total global carbon dioxide equivalent emissions. The overall emissions have grown by 63% % over the 1990's. The power sector contributes with almost half of the total emissions[36]. In fact, carbon emissions historically have been exacerbated by the low energy efficiency of coal-based electricity generating plants. Increased coal consumption over the past four decades has led to a nine-fold increase in energy-related carbon emissions.

Coal represents 55% of India's total primary energy use and 70% of its consumption is accounted by the power generation sector[37]. Coal consumption level in 2001 was 360 million short tons and is forecasted to increase to 431 million short tons in 2010 and to 510 million in 2020[38]. Between 1990 and 2000, improved combustion in coal-fired power plants avoided 2.5 MT CO2e[39]. Besides new combustion technologies, the Indian government has recently undertaken initiatives to encourage the use of higher quality coal, improvements in coal washing40 and coal bed methane capture. Moreover, coal tariffs have been reduced to 35% and the use of washed coal will be mandatory in all power plants from 2001 onwards[41].

[36] Power outages, the unreliability of electricity supplies and the fact that about 20% of the population lacks access to electricity place great challenges to India.

[37] U.S. Energy Information Administration: India Country Analysis Brief 2003.

[38] U.S. Energy Information Administration: International Energy Outlook 2003 - Table A6: World Coal Consumption by Region.

[39] Chandler *et al.,*2002. *Op cit*.

[40] Coal washing can decrease the ash content from Indian's coal typical 45-50% to 30% or even less, improving the coal's efficiency while reducing its carbon emissions when burned (USAID/India Program, 2003): http://www.usaid.gov/in/UsaidInIndia/Articles63.htm.

[41] U.S. Energy Information Administration: India Country Analysis Brief 2003.

5 Emissions and energy markets

Fossil fuel and electricity production represent almost half of total energy-related emissions. Their markets are continental or global. Resource discoveries, resource scarcity, regulatory and environmental policy and geopolitics can all have a large effect on emissions over time. Any climate change plan with a fixed target must be able to progressively modify its policies and measures to reflect changes in energy markets. For example, the surge in Canadian exports of oil and natural gas between 1990 and 2001 caused 22% of the total increase in energy-related emissions over the period.

The effects on emissions of recent and anticipated energy market shifts may be described as follows:

Crude oil exports increased by 54% between 1990 and 2000, rising from 54% to 59% of production, which itself grew by 29%[42]. Exports alone in 2000 were 83% of total production in 1990. Emissions associated with crude oil production were responsible for 17.7 MT of new inventory between 1990 and 2001.[43]

Oil sands production, which is inherently emission-intense, increased rapidly but became up to 45% less emission-intensive over the 1990's due to new extraction technology and the use of natural gas for cogeneration. Oil sands production is expected to grow rapidly in the coming decade because of its competitive and politically secure position for the US market. Production between 2001 and 2003 is estimated to have increased by 50%.[44] There is virtually no upper limit to the physical supply of bitumen.

The North American natural gas market became fully integrated in the wake of market reforms in the early to mid 1980's. New, low-cost Canadian reserves became connected and the US market became increasingly dependent on Canada for new supply. Natural gas exports increased by 137% between 1990 and 1999. As natural gas exports increased, so did upstream emissions from production and processing as well as from pipeline compressors. Emissions related to exports of natural gas contributed an additional 21.5 MT to Canada's inventory in 2001, relative to 1990 levels.[45]

North America is facing substantially tighter markets for natural gas due to resource depletion and escalating demand. Demand is being driven by the market for new

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[42] Natural Resources Canada, *Canada's Emissions Outlook: An Update*, Annex C Macroeconomic Analysis Line MVPEXT http://www.nrcan.gc.ca/es/ceo/outlookc.pdf.and National Energy Board, Crude Oil and Petroleum Products, Total Crude Oil Exports: http://www.neb-one.gc.ca/Statistics/CrudeOil_PetroleumProducts/export00.xls. Production was 1668 thousand bbl/day in 1990; 2157 in 2000; exports were 895 in 1990 and 1381 in 2000

[43] Environment Canada, 2003, *Canada's Greenhouse Gas Inventory 1990-2001*, Executive Summary, Table S- 6: Combined Crude Oil & Natural Gas: Production, Net Export, and GHG Emissions Trends, 1990-2001: http://www.ec.gc.ca/pdb/ghg/1990_01_report/executive_e.cfm#t3

[44] National Energy Board, Crude Oil and Petroleum Products, Estimated Production of Canadian Crude Oil and Equivalent. http://www.neb-one.gc.ca/Statistics/CrudeOil_PetroleumProducts/esccoe03.xls.

[45] Environment Canada, 2003, *Canada's Greenhouse Gas Inventory 1990-2001*, Executive Summary, Table S- 6: Combined Crude Oil & Natural Gas: Production, Net Export, and GHG Emissions Trends, 1990-2001: http://www.ec.gc.ca/pdb/ghg/1990_01_report/executive_e.cfm#t3.

electricity generation, a market that is expected to grow as the first generation of coal-fired and nuclear plants begins to retire. The natural gas-fired combined cycle turbine has an 80% share of new generation in North America. In the West alone, nearly 10,000 MW of natural gas-fired generation was added in 2000 and 2001, adding a fuel requirement equal to 10% of total Canadian production. On the supply side, there is strong evidence that low-cost shallow reserves in Canada and the US are being depleted, which will attract development into the Arctic, into deeper offshore waters in the Gulf of Mexico, into coal bed methane and into Liquefied Natural Gas (LNG) imports. For example, an October 30, 2003 report by the US National Petroleum Council concludes that conventional gas sources are able to provide only 75% of continental demand for the next 15 years. The report considers two supply scenarios. The less aggressive scenario (in terms of easement of environmental and regulatory restrictions on new supply) assumes the Mackenzie Valley pipeline in service in 2009 and the Alaska pipeline in service in 2013. It also assumes the return to service at full capacity of all four existing LNG terminals and the construction of seven new LNG terminals and seven expansions of them, all with 2-year licensing processes. LNG imports would constitute, by 2025, approximately 75% of Canada's current total production.[46]

The shifts in the markets have substantial implications for Canadian emissions. While more upstream activity and investment is expected, total Canadian natural gas production may not increase, because of declines in production rates from existing wells and low-cost regions.[47] Upstream emission intensity of production may be expected to go up due to the development of deeper, more remote sites.

The upstream effects on emissions may be surpassed by effects in fuel markets due to higher natural gas prices, especially for electricity generation. Where natural gas prices were in the US$2.00 – 2.50/mmbtu range[48] as late as 1999, the average price has more than doubled since the winter of 2000 – 2001. Current projections vary widely because it is difficult to know how the sudden decline of reserves will play out. For example, the National Petroleum Council report suggests a price of US$5.00/mmbtu in 2005 in both of its scenarios. In the less aggressive scenario, the price ranges up to over US$7.00/mmbtu by 2020.[49] As of Mar 5, 2004, there is no settled future natural gas price less than US$5.09/mmbtu through to the end of 2005; the prices until then range up to US$6.08/mmbtu.

Higher natural gas prices will have a complex effect on electricity-related emissions. Whereas previous projections for Canada assumed a strong dominance of the gas turbine

[46] National Petroleum Council, *Balancing Natural Gas Policy – Fueling the Demands of a Growing Economy.* http://www.npc.org/. This is the "reactive" scenario, 12.5 bcf/day of imports versus approximately 16.5 bcf/d Canadian production.

[47] Figure 4k-2 p. 4-129 (ref note 48) shows a slight decline to 6 Tcf/year by 2020. To this would be added approximately 0.55 Tcf/year from the Mackenzie pipeline.

[48] All natural gas prices are NYMEX (New York Mercantile Exchange) prices at Henry Hub

[49] *Balancing Natural Gas Policy: Fueling the Demands of a Growing Economy*; National Petroleum Council; Fig. 49.

in new generation − 50 – 80% for projections of 1998/99 vintage[50] − high natural gas prices are making a variety of competing forms of supply more cost-effective, including all of coal, nuclear and renewables, for an indeterminate net emissions effect. The competitive margins will play out, province by province, with environmental policies and regulatory risk playing key roles in addition to price. The effects will be substantial because a large amount of coal and nuclear capacity built in the 1970's is due to reach retirement age. By 2020, approximately 15% of Canada's current generation capacity will have reached its 40th anniversary. New generation requirements by 2020 for both plant replacement and demand growth are projected to be 40% of the current stock of approximately 105,000 MW, or 42,000 MW.[51]

The potential "swing" in BAU emissions for the next decade due to uncertainty in electricity supply related to natural gas prices is perhaps +/- 20 MT.

Uncertainty around the level of BAU emissions resulting from a rise in natural gas prices therefore increases the national risk in meeting a fixed MT target, and may increase the cost because of a larger emissions gap. Illustratively, if coal is the response to higher gas prices, BAU electricity sector emissions would be perhaps 20 MT higher than projected.

In summary, almost half of energy-related emissions in Canada are in the production of fossil fuels and electricity. These markets are subject to multi-year or decadal shifts of great magnitude, in terms of market shares, production levels, resource costs and fuel choice, all of which have large effects on emission levels. Therefore any climate change plan with a target must be able to adapt the intensity and scope of its activities as energy markets unfold.

[50] See e.g. *Bird's Eye View of Electricity Supply and Demand to 2020*, Canadian Electricity Association, and GCSI Inc July 2001. Chart 17

[51] Calculations by GCSI, and The Canadian Electricity Association, *Canadian Installed Generation Capacity: 2000*: http://www.canelect.ca/english/electricity_in_canada_snapshot_Demand_5.html.

6 Assessment of the Climate Change Plan

Section 3 above demonstrates the difficulty that Canada will encounter when trying to achieve its Kyoto target. However, approximately 3.7 billion dollars of federal money and additional provincial and municipal government sums have been spent on or allocated to greenhouse gas reduction. The question of what has been gained naturally arises. A numerical answer would require a technical evaluation of each of the many programs and activities as well as the overall strategy. A number of evaluations of Canada's national climate change plans were conducted in 1996 (Review of national action plan by RFI)[52]; in 2000 (Pembina Institute "Five Years of Failure")[53], in 2002 (A Comparison of Current Government Action on Climate Change in the U.S. and Canada).[54] Evaluations of individual aspects of the climate change plan have occurred every year since 1998 (audits on environmental and sustainable development matters from the Office of the Auditor General of Canada)[55].

The *Climate Change Plan for Canada* (CCPC) of November 2002, plus Budget 2003 represent the culmination of efforts since the signing of the Kyoto Protocol. The CCPC has not been assessed to date. The discussion here is limited to observations and examples.

1. There is no account in the CCPC of how emission reduction estimates were made. The CCPC includes all the previous programs and activities of the government, but there is relationship between the estimated reduction in GHG emissions in the CCPC to specific budget items and programs in the program packages now committed. This makes it difficult to evaluate the CCPC GHG reduction estimates, even for programs underway, because there is no link to information about how they were made. For example, the CCPC does not indicate if the emission reduction estimates rely on the analytical work done by the Issue Tables and the AMG. [56] Attachment 1 provides

[52] *Reviewing the Progress Made Under Canada's National Action Program On Climate Change*; RFI, Torrie Smith Associates and Policy Assessment Corporation, November 19, 1996

[53] The Pembina Institute, 2000, *Five Years of Failure: Federal and Provincial Government Inaction in Climate Change During a Period of Rising Industrial Emissions*.

[54] The Pembina Institute, 2002, *A Comparison of Current Government Action on Climate Change in the U.S. and Canada*.

[55] Over the past decade, the Office of the Auditor General has performed audits of federal programs and activities with a direct impact on the environment and sustainable development. For the list of reports from 1998 to 2003 see *The Commissioner's Mandate*: http://www.oag-bvg.gc.ca/domino/cesd_cedd.nsf/html/menu1_e.html.

[56] "We could not reconcile the information provided by the federal government in different announcements and reports. Are the 65 MT reductions those that are predicted to result from the funding and initiatives approved in the Action Plan? Subsequent budget announcements by Ministers Goodale, Anderson and Martin in late 2001 are related but how? Do the 65Mt of reductions include initiatives identified in the First Business Plan to be delivered by other governments and the private sector? We could not find a publicly available document that lists precisely, in one place just how the reductions from the initiatives included in *Action Plan 2000* add up to 65 MT "

budget and program details by year and sector. This attachment also shows that it is not possible to cross-classify the set of programs drawn from the various planning and budget documents with the programs identified as commitments in the CCPC.

2. The CPCC contains a high proportion of activities that are hypothetical, i.e. proposals or ideas, as opposed to commitments. While any plan can be expected to contain a mix of commitments, proposals and ideas for discussion, the CCPC also includes several proposals and ideas under "actions underway". In other words, not all actions underway can be considered emissions reductions already secured.

   For example, automobile and light truck efficiency standards are a cornerstone of transportation emission reduction policy. The *Motor Vehicle Fuel Consumption Standards Act* enables mandatory standards, and was passed by Parliament in 1981, but not proclaimed. The CCPC does not propose proclaiming the Act, but the CCPC assumes under actions underway a 25% increase in fleet efficiency by 2010, for a 5.2 MT reduction. The CCPC also does not provide evidence of voluntary commitment. Voluntary commitment could be costly for the auto manufacturers because the highest margins are in the fastest growing, least fuel-efficient automobile market segment, namely SUVs and light trucks.

   The CCPC includes 5.4 MT of reductions for actions underway, relating to cooperation with provinces to reduce barriers to interprovincial electricity trade and transmission. The area of focus is to provide hydro-electricity from new plants in Quebec and/or Manitoba to displace fossil fuel electricity, primarily in Ontario. Illustratively, if all the energy displaced were coal-fired, this would imply approximately 1200 MW of new hydro construction (e.g. the Conawapa project, 1250 MW in Manitoba, originally shelved in 1992) to feed the Ontario market. More hydro capacity would be required if some displaced energy were natural-gas-fired. Cooperation to reduce barriers does not necessarily lead to construction. Permitting and construction of major hydro projects and transmission corridors typically take six to eight years or more. The CCPC does not refer to commercial agreements or to First Nations aspects or to competitive economics, which would have to work out favourably for hydro.

3. Some of the emission reduction estimates appear to be optimistic. For example, the CCPC estimates 2.8 MT of emission reductions related to the Wind Power Production Incentive. That incentive is limited to approximately 1000 MW of new capacity. For that capacity the estimate is consistent with the assumption that 100% of the displaced electricity is coal-fired.[57] However, some wind power can be expected to displace natural gas, notably in Quebec, Manitoba and BC.[58] For example, Quebec has announced that it will procure 1000 MW of wind energy over ten years.

Action Plan 2000: Where are the 65 MT, Carole Burnham and Robert J. Redhead, for the Canadian Chamber of Commerce, Feb 10 2002.

[57] At a typical wind capacity factor of 32%, generation from 1000 MW is 0.32 x 8.76x 1 = 2.8 Twh which implies 2.8 MT displacement of coal at 1.0 MT/Twh.

[58] The Canadian Wind Energy Association (*Harnessing The Wind to Help Meet Canada's Kyoto Commitments*, Dec 2002) assumed 50% gas and 50% coal, in which case the 2.8 MT becomes 2.0 MT.

Similarly, the CCPC includes (under Next Steps) investments in transit infrastructure and services that could reduce emissions by "up to 3 MT". This would require a significant investment based on developments underway. For example, the Richmond Airport Vancouver Rapid Transit Project is estimated to cost approximately $1.5 - $1.7 billion, of which governments would be contributing $1.2 billion.[59] However, direct net emission reductions of CO_2 are only on the order of 10 thousand tonnes for 2010 and 14.0 thousand tonnes for 2021.[60]

4. Some estimates may include all of the reductions for projects in which investors are also expecting GHG reductions. For example, the Plan estimates 2.2 MT for actions underway with respect to grants or beneficial loans for landfill gas projects funded through the Federation of Canadian Municipalities. However, the financial analyses upon which the projects may assume a positive revenue stream from emission credits − in the case of methane destruction projects, for example, credit is the sole source of revenue. But the credit can only have value if it represents a real reduction in inventory. Thus some portion of the inventory reduction would be double-counted if both the federal government and the municipality claim the full credit.

   The CCPC estimates 2.7 MT of indirect emission reductions related to actions underway in residential and commercial/institutional buildings. Indirect emissions are those saved by not having to generate fossil-fuel-fired electricity to supply buildings made more efficient under the program. But electricity-related emissions are covered under the LFE DET in any case. Indirect emission reductions may simply allow offsetting emissions elsewhere within the LFE sector, while preserving compliance.[61]

5. Targeted measures and funds in the plan to date are sub-divided into many individual programs. Attachment 2 shows the inventory of federal and provincial programs to date, of which there are over 90. In many of the programs, amounts of funds provided per applicant or beneficiary tend to be small and carry high administrative costs on both government and applicant's sides. When incentives are below the threshold for many potential beneficiaries, the programs tend to invite a high proportion of free-riders and are therefore less effective. For example, the [Renewable Energy] Market Incentive Program has a budget of $25 million over 5 years for the promotion of voluntary green electricity purchases by small customers. The Program expects to cause 3000 – 4000 Gwh annually of green electricity by 2010. At an average of $5 million per year, this implies a subsidy of only $1.43/Mwh, which is on the order of

[59] The Richmond Airport Vancouver Rapid Transit Project (RAV project), Frequently Asked Questions, How much will the RAV line cost?: http://www.ravprapidtransit.com/en/faq.php#1.

[60] GCSI and RWDI West Inc, 2003, *Air Quality and Greenhouse Gas Emission Benefits of the Richmond Airport Vancouver Rapid Transit Project*:
http://www.eao.gov.bc.ca/epic/output/documents/p208/1054662323076_c752c6dfa0f1497f8c50ed8b5066f50a.pdf

[61] Industry targets are intensity targets. Indirect emission reductions change both electricity emissions and electricity production; the net effect on actual intensity can be positive or negative, depending on whether the intensity of indirect emission reductions is assumed to be higher or lower than actual intensity for the industry as a whole.

2% of a typical retail electricity price.[62] It is difficult to see how such an incentive could have such a large effect.

6. Substantial emission reductions are attributed to voluntary action and information programs. For example,

    - (under actions underway) negotiation of voluntary agreements with air, rail, truck and marine sectors to improve fuel efficiency of goods transport (2 MT)
    - consumer action on vehicle efficiency, including off-road vehicles (0.8 MT)
    - the personal challenge to Canadians to reduce their own emissions by one tone per year (~30 MT)

    Voluntary actions are often difficult to distinguish from business as usual, especially in competitive markets. A determination of whether the reduction would have happened anyway requires speculating about the weight of different factors within complex decisions. Although some companies have taken on internal emissions reduction targets and made reductions that are clearly not business as usual[63], a general assumption about the availability of voluntary reductions cannot be considered a reliable source of emission reductions.

    The one-tonne challenge also cannot be considered a reliable source of emission reductions. The challenge is not supported by any implementation plan or rationale for why Canadians are expected to respond.[64] The evidence of energy conservation programs is that marketing personal behaviour change to consumers on the basis of energy use is not effective because people do not think of energy consumption as an activity they intentionally do, but as a side effect of other activities.[65]

7. CCPC budget figures include costs of internal government coordination and policy development. For example, almost $18 million of $51.6 million (one third) of the Climate Change Action Fund in 2002-03 was spent on operations for Federal Coordination, Federal/Provincial/Territorial Coordination and Consultations, Communications, and Development/Analysis of the LFE DET and other policy options.[66]

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[62] Natural Resources Canada: *The Market Incentive Program*: http://www.nrcan-ncan.gc.ca/media/newsreleases/2002/2002128b_e.htm.

[63] *Corporate Greenhouse Gas Reduction Targets*; Michael Margolick and Doug Russell, GCSI; for the Pew Center on Global Climate Change, Washington, DC, November, 2001.

[64] "This reduction represents 13 % of the total reduction Canada needs to make to meet its Kyoto target. But the plan does not specify how this will be accomplished or how it will be measured." http://www.oag-bvg.gc.ca/domino/other.nsf/html/03nr01_e.html

[65] Paul Stern; *What Psychology Knows About Energy Conservation* in American Psychologist, Vol. 47. No. 10; October, 1992

[66] Climate Change Action Fund 2002-2003 Annual Report, Appendix A: CCAF Expenditures 2002-03: http://www.climatechange.gc.ca/english/publications/ccaf_200203/appendix.asp

8. Among all the programs and measures of the CCPC and its predecessors, probably the most successful has been the LFE DET. Industry covenants, backed by legislation, are expected to cause real emission reductions. [67] It is expected that a workable system will be in place to effect the complex accounting made necessary through the use of intensity targets, rather than a cap. Special efforts will need to be made to ensure liquidity.[68] The system will also have to be designed carefully to allay concerns over market distortions and potential gaming related to the government's price guarantee.[69]

9. A substantial amount of analytical work has been done to lay the foundations for a more effective plan: Canada now has extensive microeconomic research about the costs of individual technologies and policy options that were developed in 1998 – 2000 as part of the issue process. The emission inventory has been strengthened, which will support accurate estimation of the effects of future measures. There is also a good understanding of the co-benefits related to GHG emission reductions. Research is underway on new technologies such as CO_2 capture and storage.

Summary: The CCPC does not provide the basic information that is necessary to conduct an assessment of its emission reduction estimates. In particular, there is no linkage between proposed actions and estimated GHG reductions; and the measures described as "actions underway" are not linked in any traceable way to programs and activities in previous plans. Several of the emission reduction estimates appear to be unduly optimistic. The targeted measures generally consist of many small measures that are designed around the edges of the major job of turning over energy-related infrastructure, and are of a program types that have high administrative costs and restrictive requirements. There is too much reliance on information, suasion and voluntary action for a mature plan oriented to the 2008-12 period. There are additional issues around sharing GHG emission reduction credit with other participants in emission reduction activities. Finally, the CCPC includes as "actions underway" several major investments and activities that can only be considered speculative. Although the CCPC has seen some success with respect implementation of the LFE DET, on balance the CCPC can be expected to fall well short of its intended target.

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[67] The reductions attributable to the LFE DET may be more or less than 55 MT, depending on the extent to which BAU emissions and BAU production as projected for the purposes of fixing target intensity over the Kyoto period differ from what emissions and production (really) would have been in 2008-12 in the absence of the DET.

[68] *Key Issues To Be Considered in the Development of Rate--Based Emissions Trading Programs: Lessons Learned From Past Programs* by Richard Rosenzweig and Matthew Varilek; Natsource LLC; EPRI Workshop, Vancouver, British Columbia April 29, 2003

[69] Natural Resources Canada, 2003, *Implementing a $15 Price Cap on Domestic Trading CO2 Emissions.* http://www.nrcan-rncan.gc.ca/lfeg-ggef/English/price_cap_implementation_en.pdf. "This study argues that the government will be subject to considerable price risk and quantity risk from the guarantee. Unless implemented carefully, the cap is likely to have a considerable effect on market prices and on market liquidity. The cap also leaves open a considerable incentive for companies to enter into unintended speculative trades on the permit market."

7 Lessons Learned

A decade-long look back over the development of Canada's GHG emission reduction strategy leads to some observations that may be useful in the design of future plans.

The key lesson is the need for political buy in at highest political levels for the changes that are necessary. In Canada, the high-level abstract political debate over the target has not been followed by high-level practical negotiations around the plan to achieve it. As a result, Canada's plan has not adequately addressed the root cause of growing emissions. Reducing energy-related GHG emissions means replacing long-lived capital stock that is carbon-inefficient with low-emitting energy technologies and with energy-efficient equipment, buildings and vehicles. While measures such as the LFE DET and the Wind Power Production Incentive do address stock replacement, at least directionally, the economic forces that govern production and investment in energy-related areas overwhelm the types of suasion, rules and incentives that have been developed so far.

A large number of small programs may have the appearance of lots of activity but in our view, a stronger push in the form of many small programs would not address the root cause of emission growth. It would be better to focus the funds, and taxation and regulatory changes on a smaller number of simply designed measures that apply significant, definite and long-term economic signals as a form of steady pressure on the capital stock in energy producing and energy consuming sectors.

The analytical work of the AMG and Tables focused heavily on theoretical cost curves that rank emission reduction projects or technologies in order of unit cost of GHG emission reduction. This formula works well when emissions reduction is the only beneficial outcome of projects being compared. However, the formula progressively breaks down as the extent and number of co-benefits increases. For example, it may be appropriate to compare truck engine retrofits with ethanol fuel blends on financial and emission accounts alone, since these are their primary impacts. By contrast, truck engine retrofits and ethanol fuel blends do not reduce congestion or accident rates as does transit, whose primary benefits do not lie in direct emission reductions. One-dimensional ranking of emission reduction costs for technologies or projects in complex sectors such as transportation and buildings has not been an effective guide to practical strategy. As the weight non-GHG attributes of projects increases, it becomes increasingly ineffective to use emission reductions as a means to motivate investors and users

There may be conflicts within the DET if government is a rule-maker and market player at the same time. Under the current plan, if the international credit price is greater than $15/tonne or if the international system does not function adequately, or if production exceeds projections, there may be an additional financial liability for the government in meeting a fixed target. It is important for investors to know at the outset that the market rules are not going to change based on government perceptions of its own financial risk.

The discussion of the energy industry in the 1990's and current uncertainties show that dynamic energy markets can change the size of an emissions gap in a relatively short amount of time. A plan based on one set of business-as-usual projections is not robust. Policy and analysis need to adopt an integrated perspective on emissions and energy markets.

Social marketing can be effective to advance awareness but may not be a reliable source of emission reductions. Market and consumer research has shown that behavioural changes in consumer energy use as a result of suasion are impermanent and tend to occur only in response to short-term crises.[70]

[70] *Energy Use and Carbon Emissions from Freight in Ten Industrialized Countries: An Analysis of Trends from 1973 to 1992***.** L.J. Schipper, L. Scholl, and L. Price. Transportation Research, Part D: Transport and Environment 2 (1) 57-76, 1997. (LBNL-38826)

8 Means for improvement

Canada's weak performance in reducing GHG emissions is well known. While the 2004 Throne Speech re-commits Canada to meeting its Kyoto obligation, the recently appointed Cabinet faces a major task in reversing emissions growth. Some areas for consideration that have arisen through this review include:

1. Embed GHG emission reductions in a sustainable development framework.

   The "co-benefits" argument has been turned on its head with respect to many or most of the activities that reduce emissions in end-use sectors such as households, transportation and buildings. GHG emission reduction is only a minor collateral benefit for investments like transit, wall insulation, appliance standards and heat pumps. While the outcomes of implementation do not change, the marketing of the activity as well as its positioning within the bureaucracy both rely on *why* the activity is being promoted. Under a sustainable development framework, the climate change plan would focus on activities where GHG reduction is an important driver, rather than duplicate efforts that may be more effectively organized and marketed by others.

2. Commit to measures up front for enough time to effect the necessary changes

   Investors need substantial and long-term economic signals in order to affect the turnover of long-lived capital stock in energy using and energy producing sectors. The planning periods for some of these investments are longer than the electoral cycle. Measures that affect stock turnover must affect return on investment calculations for equipment that can last decades. In the absence of long-term commitment that can be included with confidence in such an investment analysis, government measures may continue to largely operate around the fringes of the problem.

3. Concentrate on commercial markets, not economic theory

   Economic analysis is an essential component of any plan. However, it is a theoretical framework that does not, and cannot properly reflect the multi-dimensional choices that people and companies make. This fact is well known in energy conservation, where investments with apparently very high returns are not attractive to households and plant owners. A fixed amount of money or a regulation can result in a wide range of emission results depending on the form in which it is provided.

4. Fund or incentivize above thresholds.

   The political need to distribute benefits equitably among regions and sectors has tended to dilute incentive amounts available per application or proponent. In case of too-low incentives, take-up will be minimal and the effectiveness of the program reduced because of the high proportion of free-riders and the fixed costs of administration. New technologies require greater incentives than suggested by economic models because capital markets demand high premiums for taking risks in early commercial applications. Market knowledge and on-going experience can lead to fine-tuning of incentive levels as the program continues.

5. Make appropriate use of the international market for GHG emissions reductions

   The emergence of a liquid, robust international market for greenhouse gases is a vital part of a global response to climate change. The market will send a price signal that is needed for corporations and individuals to take appropriate action and will reinforce government measures and GHG reduction policies. Canada's active participation in this market will be vital if GHG emission reductions are to be met in a cost-effective manner. Any new plan for Canada must recognize the need for significant Canadian purchases in the market and, the earlier the better.

6. Limit government to GHG emission market creation and regulation, not market operation

   The DET system can benefit from lessons learned from other commodity markets. The most important element will be the resolve of government to establish clear targets and allocation and to ensure consistency with the national GHG emissions inventory and enforcement of compliance and penalties. The mechanisms of emission trading can be handled efficiently by emitters and private brokerage and trading firms. In other words, the "trade" part is likely to flow efficiently with little government participation once the "cap" part is in effect.

7. Help new technologies through the "valley of death".

   The "valley of death" refers to the first commercial application of a new process or technology. In its wish to avoid "picking technology winners", the government generally avoids assisting at this stage, whereas investors strongly resist being first in with respect to anything new to the market. The result is one of the greatest impediments to implementing sustainable technologies. The assistance required need only take the form of commercial risk reduction, as opposed to subsidies that do not depend on commercial outcome. The cost to government is then nil or minimal if the application works as expected, while investors' "first-in" risk is mitigated. Assistance through the valley of death is unnecessary once the application proves up and markets can take over.

8. Start at the top and with the big picture: build trust and reduce uncertainty through consecutive negotiations and agreements at increasing levels of detail and decreasing levels of seniority.

   Canada's climate change planning has been conducted from the micro-level without the political weight behind emission reduction policy that is evident in the EU and Japan. Specific proposals have been moved up through the bureaucracy for consideration by decision-makers. But those decision-makers cannot be expected to make informed decisions about specifics without having previously decided on generalities from which those specifics flow. An alternative approach would begin at the top with principles and agreements suited to Cabinet-level discussions and federal-provincial political negotiations. The bureaucracy would then develop specific programs to conform to the senior political decisions. Politicians would in turn be more likely to follow through with engagement and

real commitment − as opposed to throwing money at the problem or choosing pet projects − once they see how those programs reflect the outcomes of their own processes and deliberations.

9. Think big and long term, but act now.

   This report suggests that the core of the plan has to be accelerating capital stock turnover towards more sustainable technologies. This is a long-term proposition that involves some of the most enduring and expensive pieces of infrastructure that exist. Steady and substantial pressure over time − a focused approach on moving these "major rocks" − is required to influence the relevant decisions. Such an approach has to start now in order for the decisions to have a substantial effect on emissions over the next decade.

Attachment I − Federal expenditures since 1997

The federal government's commitments and expenditures on climate change consist of many funds that are divided in different ways. Total commitment since 1997 is estimated to be $3.7 billion, shown by year in Table A-1 below[71] Of the total amount of $2 billion announced in Budget 2003, $700 million has not been allocated to programs.

Table A-2 is a classification of program commitments to date by sector based on a scan of budget and announcement packages over the corresponding period.[72] The Table makes some assumptions about allocations of amounts into various sub-programs where the information is not available.

As indicated in the text, it is difficult to connect these budgets and plans with the amounts described in the Climate Change Plan for Canada. For example, a total of 92 MT is estimated as due to program commitments prior to the CCPC, whereas the CCPC estimates 125 MT for "actions underway". Within the 125 MT for actions underway, there are some measures that are announced for the first time in the CCPC. However, it is not possible to identify all the amounts announced for the first time in the CCPC and it is not possible to cross-classify the programs of Table A-2 with the remaining programs of the CCPC.

[71] Source: *Climate Change Federal Investment 1997 –2002;* plus *Budget 2003*

[72] Source: 1997 Federal Budget, Budget 2000, Action Plan 2000, Budget 2001, Climate Change Plan for Canada 2002, and Budget 2003.

Table A-1 – Climate Change Federal Investments 1997-2003

Year	Full Name of Initiative	Total $ (millions)	Lead Organization	Duration (years)	End Date
1997	Energy-Efficiency and Renewable Energy Program	60	NRCan	3	2000/2001
1998	Climate Change Action Fund	150	NRCan and Environment Canada	3	2000/2002
2000	Action Plan 2000	500	Seven federal departments	5	2005/2006
	Climate Change Action Fund (extension)	150	NRCan and Environment Canada	3	2003/2004
	Energy-Efficiency and Renewable Energy Program (funding renewal)	60	NRCan	3	2003/2004
	Electricity from Emerging Renewable Energy Sources in Prince Edward Island and Saskatchewan	15	NRCan	10	
	Canada Climate Change Development Fund	100	CIDA	4	2004/2005
	World Bank's Prototype Carbon Fund	15	CIDA / DFAIT	3.5	Jun-03
	Green Municipal Enabling Fund	25	Federation of Canadian Municipalities	5	2006/2007
	Green Municipal Investment Fund	100	Federation of Canadian Municipalities	5	n/a
	Canadian Foundation for Climate and Atmospheric Sciences	60	Environment Canada	6	2005/2006
	Sustainable Development Technology Canada	100	Sustainable Development Technology Canada	5	2005/2006
2001	Wind Power Production Incentive	260	NRCan	15	2016/2017
	Green Municipal Enabling Fund (replenishment)	25	Federation of Canadian Municipalities	5	2006/2007
	Green Municipal Investment Fund (replenishment)	100	Federation of Canadian Municipalities	5	n/a
	Tax Incentive for Renewable Energy and Energy Efficiency	5	Department of Finance	n/a	n/a
2002	Fuel Cell and Hydrogen Technology, National Research Council	20	Industry Canada	5	2007
2003	Budget 2003 - To implement CC Plan for Canada	2000		5	2008
	TOTAL	**3745**			

Table A-2 – Climate Change Federal Investments Allocations per Sector 1997-2003

Sectors	Year	Initiative	Total $ (millions)	Reduction target (MT)	Years	End Date
Agriculture	2000	Action Plan 2000	25.9	5.8	5	2005-06
Forestry	2000	Action Plan 2000	9.8	0.3	5	2005-06
Sub-total Agric. & Forestry			**36**	**6**		
Buildings	2003	Budget 2003 - EnerGuide for Houses - part of Energy-Efficiency Program	6	0.7	5	2008
Buildings	2003	Budget 2003 - Retrofits of Existing Houses	73.4	1.5	5	2008
Buildings	2003	Budget 2003 - Energy-Efficient Buildings	128.8	1.6	5	2008
Buildings	2000	Action Plan 2000	95	6.1	5	2005-06
Buildings	1997	Energy-Efficiency&Renewable Energy Program (renewed in Budget 2000)	120		3	2000-01
Sub-total Buildings			**423**	**10**		
Community Initiatives	2003	Budget 2003 - Working with Prov and Terr	160		5	2008
Community Initiatives	2003	Budget 2003 - Aboriginal and Northern Com. Action	30.7		5	2008
Community Initiatives	2000	Budget 2000 - Green Municipal Enabling Fund (replenished in 2001)	50		5	2006-07
Community Initiatives	2000	Budget 2000 - Green Municipal Investment Fund (replenished in 2001)	200		5	n/a
Community Initiatives	2000	Action Plan 2000 - Northern CC program	3.7	0	5	2005-06
Sub-total Communities			**444**	**0**		
Electricity	2001	Budget 2001 - Tax Incentive for Renewable Energy and Energy Efficiency	5		n/a	n/a
Electricity	2001	Budget 2001 - Wind Power Production Incentive	260		15	2016-17
Electricity	2000	Action Plan 2000	59.9	7	5	2005-06
Electricity	2000	Budget 2000 - Electricity from Renewable Energy Sources in Prince Edward Island and Saskatchewan	15		10	
Sub-total Electricity			**340**	**7**		
Gov Actions	2003	Budget 2003 - >31% emissions in fed operations	50		5	2008
Gov Actions	2000	Action Plan 2000 - House in Order	13	0.3	5	2005-06
Gov Actions	2000	Action Plan 2000 - PERRL	14.9	3	5	2005-06
Sub-total Gov Actions			**78**	**3**		
Ind Cross-Cutting	2000	Action Plan 2000	2.1	7.2	5	2005-06
Sub-total Ind Cross-cut			**32**	**7**		
International Capacity Building	2000	Budget 2000 - Canada Climate Change Development Fund	100	0	4	2004-05

Sub-total Int'l Capacity			**100**	**0**		
International Purchases	2000	Action Plan 2000	34.9	20	5	2005-06
International Purchases	2000	Budget 2000 - World Bank's Prototype Carbon Fund	15		3.5	Jun-03
Sub-total Int'l Purchases			**50**	**20**		
nowledge and foundation	2003	Budget 2003 - One Tonne Challenge	45		5	2008
Knowledge and foundation	2003	Budget 2003 - Negotiations, reporting, etc	80		5	2008
Knowledge and foundation	2000	Action Plan 2000	50	0	5	2005-06
Knowledge and foundation	2000	Action Plan 2000 - Multisectoral without PERRL	29.1		5	2005-06
Knowledge and foundation	1998	Climate Change Action Fund (ext in budget 2000, incl new international component)	68.5		5	2002-03
Knowledge and foundation	1998	Climate Change Action Fund (ext in budget 2000) - Science, Impacts & Adaptation	30		5	2002-03
Public Education and Outreach	1998	Climate Change Action Fund (ext in budget 2000)	60		5	2002-03
Sub-total Know&Found/PEO			**63**	**0**		
R&D	2003	Budget 2003 - Technology and Innovation	270	0.6	5	2008
R&D	2002	Fuel Cell and Hydrogen Technology, National Research Council	20		5	2007
R&D	2000	Action Plan 2000 - CO2 Capture Storage	24.5	7	5	2005-06
R&D	2000	Budget 2000 - Cdn Found. Climate and Atmospheric Scs. (replenished in Budget 2003)	110		6	2005-06
R&D	2000	Budget 2000 - Sustainable Development Technology Canada (replenished in Budget 2003)	350		5	2005-06
R&D	1998	Climate Change Action Fund (ext in Budget 2000) - reserve	30		5	2002-03
R&D	1998	Climate Change Action Fund (ext in budget 2000) - TEAM	111.5		5	2002-03
Sub-total R&D			**916**	**18**		
Transportation	2003	Budget 2003 - Marketing of Efficient Vehicles	5.5	0.4	5	2008
Transportation	2003	Budget 2003 - Labelling of Off-road Vehicles	1.5	0.4	5	2008
Transportation	2003	Budget 2003 - Energy-Efficient Transportation	54.1	11.2	5	2008
Transportation	2000	Action Plan 2000	96	8.9	5	2005-06
Sub-total Transportation			**157**	**21**		
		TOTAL	**2939**	**92**		

Attachment II − Inventory of Programs

The tables below summarize the known federal and provincial programs, of which there are almost 100. The list may not be exhaustive. The various cells have been filled in on a best efforts basis, given time and resources available. There may be some overlaps as well, where specific listed programs are part of an umbrella program.

Federal Programs

Program	Goals	Budget	Delivery mechanism	Lead Organization
Action Plan 2000	65 MT per year by 2010	$ 500 million over 5 years	45 specific measures in distinct but inter-related sectors to reduce GHG emissions and address understanding of science, impacts, and adaptation.	Environment Canada and NRCan
Advanced Combustion Technologies	To assist the industry to develop cleaner and more energy-efficient combustion processes		Seven pilot scale industrial boilers and furnaces, laboratories for equipment testing, laser diagnostics and fuel characterization as well as emissions monitoring capabilities and a strong computer modeling team.	NRCan: CANMET Energy Technology Centre http://www.nrcan.gc.ca/es/etb/index_e.html
Biodiesel R&D	To encourage broader use of this alternative to conventional diesel	$ 11.9 million	Research and demonstrations of biodiesel use and for industrial-scale biodiesel pilot plants	Climate Change Plan for Canada 2002 Government of Canada
Bio-fuels R&D		$ 30 million	Biomass and waste conversions; cellulosic ethanol; among others	
Building Energy Technology (BET) Program	to accelerate the development and adoption of innovative technologies in the marketplace, positively impacting the energy efficiency of residential and commercial buildings	Since 1989	Undertakes collaborative projects with other agencies assigning priority to emerging technologies such as space and water-heating systems, high-performance windows, cooling and ventilation equipment, day-lighting and systems integration and "green" building information.	NRCan: Buildings Group, CANMET Energy Technology Centre www.buildingsgroup.nrcan.gc.ca

Program	Goals	Budget	Delivery mechanism	Lead Organization
Building Refrigeration Research and Development Program - CANMET	Reducing GHG emissions through improvements in the energy efficiency of refrigeration systems.	Since 2000		NRCan: CANMET Energy Diversification Research Laboratory cedrl.mets.nrcan.gc.ca
Building Sector Initiatives: Accelerated Standards Action Program (ASAP), Comercial/Institutional Building Retrofit Program (CIBRP); Energy Efficient Housing Initiative (EEHI)	To reduce GHG emissions by educating and encouraging typical Canadian consumers and businesses to adopt and implement energy efficient practices. Annual reduction target in 2010 of 6.1 MT CO2	$ 95 million	The ASAP involves advertising campaigns and partnerships and deployment of a series of market based incentives that will encourage consumers to purchase the "best in class". The CIBRP encourages owners and operators of existing commercial and institutional facilities to reduce operating costs and energy use through investments in energy efficiency. The EEHI has a component for existing housing and one for new housing, consisting of rating system and the R2000 standard that promotes energy efficient housing renovations and construction.	Action Plan 2000 - NRCan
Canada Climate Change Development Fund (CCCDF)	To help address the causes and effects of climate change in developing countries	$ 150 million over 1998-2003	It combines technology transfer with a capacity building approach. 45 projects and funds are being implemented throughout all regions of the world	CIDA
Canadian Clean Power Coalition (CCPC)	To assess the technology options for commercial project demonstrations through the construction of two clean coal demonstration plants	$5 million for phase 1 ($1.66 million federal government ; $300 k Gov of Saskatchewan; $550 k Gov of Alberta)	Feasibility study phase. To develop and execute studies to evaluate technology options, finalize our cost estimates and funding arrangements and develop detailed plans. Total cost estimated to be nearly $1 billion dollars 2002-2012.	Canada's coal-burning electrical utilities and coal producers (90 % of Canada's coal-fired electricity capacity), NRCan; Alberta Gov and Saskatchewan Gov
Canadian Renewable and Conservation Expenses (CRCE)	To promote the development of conservation and renewable energy projects (solar, energy from waste, forest biomass,	-	It allows investors to fully write-off intangible costs associated with investments in renewable energy and energy conservation projects. Projects in with at least 50% of the capital cost of the depreciable property is included in Class 43.1	Department of Finance, Canada Customs and Revenue Agency, CANMET Energy Technology

Program	Goals	Budget	Delivery mechanism	Lead Organization
	geothermal, small hydro, wind)			Centre www.fin.gc.ca www.ccra-adrc.gc.ca www.nrcan.gc.ca
Canadian Transportation Fuel Cell Alliance Program (CTFCA)	To demonstrate 5 different combinations of fuels and fuelling systems demonstrated by 2005 - for fuel cell vehicles	$ 23 million Since 2001	Development of fuelling options for light, medium and heavy-duty vehicles and standards and training and testing procedures for fuel cell and hydrogen technologies	NRCan: Transportation Energy Technologies Group, CETC/ES www.ctfca.nrcan.gc.ca
Class 43.1 Accelerated Capital Cost Allowance	To assist investments in equipment designed to produce energy in a more efficient way or to produce energy from alternative renewable sources	$5 million	Accelerated rate of write-off for certain capital expenditures for such equipment. It allows taxpayers to deduct the cost of eligible equipment at up to 30 % per year, on a declining balance basis	Department of Finance, Canada Customs and Revenue Agency, CANMET Energy Technology Centre
Climate Change Plan for Canada 2002	To enhance awareness, to reach 500 million liters of biodiesel production by 2010, and to increase the target for ethanol blending to 35% of gasoline supply	$ 2 billion from Budget 2003 over 5 years	Three-step approach for achieving 240 MT GHG emission reductions.	Government of Canada
Commercial Building Incentive Program (CBIP)	to improve the energy efficiency of new buildings, - to demonstrate market feasibility of highly efficient buildings, and to encourage a permanent transformation in general building	from April 1, 1998, to March 31, 2007	Financial incentive of up to $60,000 awarded to building owners whose designs meet CBIP requirements. Must demonstrate a reduction in energy use by at least 25% when compared to the requirements of the Model National Energy Code for Buildings	NRCan: Office of Energy Efficiency http://oee.nrcan.gc.ca

Program	Goals	Budget	Delivery mechanism	Lead Organization
	practices			
Community Energy Systems Group	To help communities become more energy-efficient by applying technologies that interconnect heat sources and sinks, and by finding more efficient and ozone-friendly cooling methods	Since 1985	identifies and develops opportunities for the use of district heating and cooling, the combined production of heat and power, industrial waste-heat recovery and thermal storage; and provides financial and technical support for implementation..	NRCan: CANMET Energy Technology Centre www.nrcan.gc.ca/es/etb/index.html
EnerGuide for Equipment	to help consumers choose the most energy efficient product Energy performance through labelling	Since 1978	Provides information on the energy performance of a range of competitive products	NRCan: Office of Energy Efficiency http://oee.nrcan.gc.ca
EnerGuide for Houses	To improve the energy efficiency and reduce the greenhouse gas emissions of the Canadian housing stock	Since 1997	Provides homeowners with the facts they need to make informed decisions about energy efficiency, whether they are making improvements to their home or buying a new home	NRCan: Office of Energy Efficiency and Canada Mortgage and Housing Corporation (CMHC)
EnerGuide for Vehicles	To help motorists consider fuel efficiency in their vehicle purchase decisions and to encourage them to choose the most efficient vehicle	Since 1998	free Fuel Consumption Guide provides a listing of fuel consumption ratings and the annual fuel costs and consumption for all new passenger cars, vans, light trucks and special purpose vehicles sold	NRCan: Office of Energy Efficiency http://oee.nrcan.gc.ca
Energy Efficiency Regulations	To eliminate inefficient energy-using equipment from the market	Since 1992	prescribes minimum energy efficiency performance levels for equipment	NRCan: Office of Energy Efficiency http://oee.nrcan.gc.ca
Energy Innovators Initiative (EII)	To help commercial businesses and public	Since 1992	offers access to tools, services and financial incentives, delivered through Energy Innovator Officers who work with members as they pursue energy	NRCan: Office of Energy Efficiency

Program	Goals	Budget	Delivery mechanism	Lead Organization
	institutions explore options and strategies to increase the energy efficiency of their buildings		management planning and retrofits	http://oee.nrcan.gc.ca/eii
Energy Technology Futures (ETF) 2050 project	a long-term framework and knowledge base		scenarios of energy service demands, innovative technology options and fuel sources	NRCan
Ethanol Expansion Program	New ethanol production facilities over the next three years	$ 100 million (part of $ 2 Bi from Budget 2003)	Seven companies' proposals for construction of new fuel ethanol facilities from across Canada were selected to receive funding.	Climate Change Plan 2002 – Government of Canada
Excise Tax Exemption for Ethanol and Methanol	To encourage the development and marketing of ethanol and methanol made from biomass	Since 1993	100% exemption from the $0.10 per litre excise tax on gasoline for ethanol and methanol made from biomass that is blended with gasoline	Canada Customs and Revenue Agency www.ccra-adrc.gc.ca
Extension of Manufacturing and Processing Tax Credit	Encourage investment in new electrical generating capacity			Department of Finance
FleetWise Initiative	Promote use of renewable energy sources in transportation. Part of Federal House in Order – Action Plan 2000 – aimed at reductions of 0.3 MT.	Since 1995 + part of House in Order $ 13 million budget	Ethanol blend used in the federal fleet; E85 vehicles are being promoted and cost reducing measures are being carried out	Federal House in Order – Action Plan 2000 Treasury Board, NRCan, Environment Canada, and Public Works and Gov. Services Canada
Fuel Cell R&D	To promote R&D	$ 80 million	Government grant	Government of Canada
Future Fuels Initiative	To increase ethanol fuel use from the current level of 240 million to 1	$ 3 million over 5 years (part of Action Plan 2000 $	Provides market information to retail consumers and renews the National Biomass Ethanol Program (NBEP), which provides for $140 million in contingent loan guarantees for new plants that	Action Plan 2000 NRCan and Agriculture and Agri-Food

Program	Goals	Budget	Delivery mechanism	Lead Organization
	billion liters in 2010, enough to blend into 25% of the gasoline volume. (0.8Mt reductions targeted)	500 million)	produce ethanol from biomass	Canada
Gov Purchases of Electricity from Emerging Renewable Energy Sources (ERES)	To purchase 400,000 MWh per year (0.2325 MT in emissions reductions)	$30 million	The federal government will purchase electricity from ERES in several provinces, particularly Nova Scotia, Ontario and New Brunswick, with additional purchases in Alberta	Government of Canada
Green Municipal Funds (GMF): Green Municipal Enabling Fund (GMEF) and Green Municipal Investment Fund (GMIF)	To stimulate investment in innovative environmental infrastructure projects. Projects must improve environment, protect the climate or promote the use of renewable resources.	$ 50 million (GMEF) and $ 200 million (GMIF)	GMEF is a permanent revolving fund that grants cover up to 50% of eligible costs (up to $350,000) for highly innovative and replicable environmental projects. GMIF finances up to 15% (25% in exceptional circumstances) of the capital costs of a qualifying project; provides loans at attractive rates (1.5% below the Gov. of Canada bond rate for municipal governments).	Federation of Canadian Municipalities and the Government of Canada
Industry Energy Research and Development (IERD)	to encourage the industry to develop new technologies that can decrease energy consumption and environmental impacts.	Since 1977	Up to 50% in contributions to eligible project costs; repayable, conditional on the commercial success of the project. The contribution level is based primarily on technical risk and potential energy savings.	NRCan: CANMET Energy Technology Centre www.nrcan.gc.ca/es/etb/etbhome.htm
Intelligent Building Research and Development Program - CANMET	to develop and disseminate knowledge and tools that make a contribution to reducing GHG through operational improvements resulting in improved energy efficiency in	Since 2000	R&D projects in cooperation with participants in the industry (manufacturers, building managers and operators, consultants), government agencies and organizations	NRCan: CANMET Energy Diversification Research Laboratory cedrl.mets.nrcan.gc.ca

Program	Goals	Budget	Delivery mechanism	Lead Organization
	buildings			
Market Incentive Program	to encourage electricity distributors to experiment with measures to stimulate sales of green power to residential and small business customers (reductions of approximately 5.4 MT by 2010)	Since 2002	Provides a limited financial incentive to electricity distributors, electric utilities, electricity retailers and energy marketers interested in developing market-based programs.	NRCan: Renewable and Electrical Energy Division www.reed.nrcan.gc.ca
National Energy Use Database (NEUD)	Monitoring and evaluation of end use energy consumption	Since 1991	supports the development of energy end-use data in all sectors of the economy by reviewing existing data and assessing information needs, expanding existing surveys or creating new ones to meet these data needs, and establishing energy end-use data and analysis centres	NRCan: Office of Energy Efficiency Demand, Policy and Analysis Division http://oee.nrcan.gc.ca/neud/dpa
Motor Vehicle Fuel Efficiency Initiative	to ensure that new motor vehicles meet or exceed average fuel efficiency standards (25% improvement by 2010	Action Plan 2000		NRCan: Office of Energy Efficiency http://oee.nrcan.gc.ca
National Fuel Cell Research and Innovation Initiative	Fuel cell research, development, demonstration and deployment			NRCan
Pilot Emission Removals, Reductions and Learnings Initiative (PERRL)	to provide an economic incentive to taking action to reduce GHG emissions and to help better understand emissions trading	$15 million for 2002-2007 ($1.8 m for admin)	The federal government will buy the rights to verified GHG emission reductions from eligible projects for a fixed price per tonne	
Program of	Development of			NRCan

Program	Goals	Budget	Delivery mechanism	Lead Organization
Energy Research and Development	a range of sustainable energy production and end use technologies			
R-2000 HOME Program	to improve the level of energy efficiency and environmental responsibility in the new housing sector	Since 1982	Voluntary technical standard that exceeds conventional building practices and codes for energy efficiency, environmental responsibility and indoor air quality; and licensed R-2000 professionals	NRCan: Office of Energy Efficiency http://oee.nrcan.gc.ca
Renewable Energy Deployment Initiative (REDI)	To stimulate the market demand for reliable, cost-effective renewable energy systems for space and water heating and cooling Ground-source heat pumps are not eligible.	$24 million over 1998-2004 + $25 million until 2007 (part of Budget 2003)	Advertising, Demonstrations, Displays and Exhibits, Printed and Audiovisual Materials, Seminars/Workshops, Financial Incentives (Grants/Contributions).Remote communities are eligible for 40% refund and businesses for 25% refund (up to $80,000) of the purchase and installation costs of a qualifying system.	Climate Change Action Plan 2002 NRCan: Renewable and Electrical Energy Division www.nrcan.gc.ca/redi
Renewable Energy Technologies Program	to support Canadian industry's efforts to develop renewable energy technologies.		Provides cost-sharing and technical assistance in support of technology development and field trials	NRCan: CANMET Energy Technology Centre http://www.nrcan.gc.ca/es/etb/index.html
Sustainable Development Technology Canada (SDTC)	Advance the development and demonstration of new technologies	$ 100 million		
Tax Incentive for Flare Gas Generation	Eligibility for higher capital cost allowance under federal taxation			Department of Finance
Technology Early Action Measures	Funds for early action technology	$60 million (1998-2001) $35	+ $500 million from the private sector, total $700 million funding approved for 50 domestic projects and 17 international	Action Fund

Program	Goals	Budget	Delivery mechanism	Lead Organization
(TEAM)	projects	million (2002-2004)	initiatives	(CCAF) Action Plan Government of Canada
Transportation Energy Technologies	To increase the market penetration of alternative transportation fuel by supporting technology development and innovative technologies that can be marketed.		Development of competitive, energy-efficient and environmentally responsible technologies for gaseous fuels (hydrogen, natural gas and propane), alcohols (ethanol and methanol), biodiesel and advanced transportation systems (electric vehicles and batteries, fuel cells and hydrogen)	NRCan: CANMET Energy Technology Branch http://www.nrcan.gc.ca/es/etb/cetc/cetc01/htmldocs/home_e.html
Voluntary Challenge Registry Inc.	Encourage private and public organizations to voluntarily limit GHG emissions			Voluntary Challenge Registry Incorporated (government representatives in the Board)
Wind Power Production Initiative (WPPI)	To encourage electric utilities, independent power producers and other stakeholders to gain experience in wind energy production	$ 260 million over 15 yrs (until 2016/2017)	Provides financial support for the installation of 1000 MW between 2002 and 2007 and a 10-year-incentive to electricity producers covering half of the cost premium	NRCan: Renewable and Electrical Energy Division www.canren.gc.ca/wppi

Provincial Programs

Jurisdiction	Program	Goals	Budget	Delivery mechanism	Lead Organization
Alberta	Climate Change Central				
	VCR Action Plan				
	Improved Coal Combustion Research	Development of more efficient fossil-fired power generation cycles			Department of Resource Development
	Removal of Barriers to use of Otherwise Flared Solution Gas	Removing barriers to electricity generation using solution gas that otherwise would be flared			Department of Resource Development, Energy and Utilities Board
British Columbia	BC Hydro GHG Initiatives	Making 10% of all new electrical generation from green resources			BC Hydro
	Cleaner Power	Meeting 10% of new demand with green energy			BC Hydro
	Energy Futures Program	Identifies realistic green energy options			BC Hydro
	Ethanol Development Program	Support the development of commercially viable technologies for producing ethanol, energy and valuable chemical by-products from softwood	$300 thousand (gov) and $ 100 thousand (CPPI) over 5 yrs		Government of BC and the Canadian Petroleum Products Institute

Jurisdiction	Program	Goals	Budget	Delivery mechanism	Lead Organization
		residue.			
	Green Power Procurement and Renewables	Power purchase from IPP – from hydro and biomass			Government of British Columbia
	Power Smart	Demand side energy efficiency			BC Hydro
	Resource Smart	BC Hydro energy efficiency			BC Hydro
	Renewable Energy Technology	Demonstration renewable energy technologies in thermal and electricity generation applications			Government of British Columbia
New Brunswick	VCR Progress Report				
	Co-generation Policy	Encourages purchase of electricity by the utility upon industry modernizing or expansion			Department of Natural Resources and Industry
	Energy Efficiency Standards for Equipment	Improve efficiency of selected products			Department of Natural Resources and Industry
Newfoundland	VCR Program				
Northwest Territories	VCR Progress Report				
	Energy Conservation Capital Program	Grants to support projects that reduce usage of electrical and heat energy			Arctic Energy Alliance
	Arctic Energy Alliance	Help reduce cost and environmental impacts of energy			NWT Power Corp., NWT Housing Corp., NWT Association of Municipalities,

Jurisdiction	Program	Goals	Budget	Delivery mechanism	Lead Organization
					NWT Public Utilities Board
Nova Scotia	VCR Action Plan				
	Energy-Efficient Appliances Act and Regulations	Increase efficiency of energy-using equipment available			Nova Scotia Natural Resources
	Green Energy and Renewables	Establish green power purchase program and increase access for green energy			Gov. of Nova Scotia, Nova Scotia Power Inc.
Ontario	Government VCR Action Plan				
	Measures to Reduce Emissions				
	Climate Change Solutions				
	Energy Competition Act	Encourages investment in clean power generation			Ministry of Energy, Science and Technology
	Energy Efficiency Act and Regulations	Prohibit sale or lease of inefficient products/appliances			Ministry of Energy, Science and Technology
	Reduced Taxes for Environment Friendly Hydropower	Encourages new investments in hydropower stations			Ministry of Energy, Science and Technology
Quebec	Climate Change Action Plan				
	EcoGESte Program	Record voluntary actions on Climate Change			Department of Environment, Department of Natural Resources
	Energy Productivity Program	Supports feasibility studies and demonstratio			Department of Natural Resources

Jurisdiction	Program	Goals	Budget	Delivery mechanism	Lead Organization
		n projects			
	House and Building Regulations	Improve efficiency in equipment powered by electricity or hydrocarbons			Energy Efficiency Agency
Saskatchewan	VCR Action Plan				
	Climate Change Action Plan Initiative	R&D projects on clean coal technology , CO2 capture and storage, and terrestrial sequestration			SaskPower
	Internal GHG Initiative	Commitment to purchase green power from SaskPower for gov. buildings and vehicles			Government of Saskatchewan, SaskPower
	Weyburn CO2 Injection Monitoring Project	Develop understanding of CO2 injection in oil-bearing geological structures			
Yukon	VCR Report				
	Energy Infrastructure Loans for Resource Development Projects	Encourage responsible and efficient use of energy in resources development			Government of Yukon
	Green Power Initiative	Displace diesel electricity production and reduce GHG reductions			Government of Yukon
	Mayo-Dawson Transmission Project	Eliminate primarily dependence on diesel			Government of Yukon

Jurisdiction	Program	Goals	Budget	Delivery mechanism	Lead Organization
		generators			
	Renewable Power Sales Incentive Program	Encourages the use of surplus renewable electricity		Guarantees a return on investment on equipment installation necessary to purchase secondary power	Government of Yukon
	Rural Electrification program	Installation of renewable alternative energy systems		Information and low-interest loans	Government of Yukon
	Wind Power Program	Overcome technical barriers to commercial-scale production		Applied R&D on wind energy	Government of Yukon
	Wind R&D Initiative	Monitoring of test sites to better determine the viability of wind regime		Applied R&D on wind energy on a pilot project basis	Yukon College, Yukon Development Corporation, Yukon Energy Corporation

Table 1. Provincial Programs

Jurisdiction	Program	Goals	Budget	Delivery mechanism	Conditions	Financing
Alberta	Climate Change Central					
	VCR Action Plan					
	Improved Coal Combustion Research	Development of more efficient fossil-fired power generation cycles				Department of Resource Development
	Removal of Barriers to use of Otherwise Flared Solution Gas	Removing barriers to electricity generation using solution gas that otherwise would be flared				Department of Resource Development, Energy and Utilities Board
British Columbia	BC Hydro GHG Initiatives	Making 10% of all new electrical generation from green resources				BC Hydro
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	Ethanol Development Program	Support the development of commercially viable technologies for producing ethanol,	$300 thousand (gov) and $ 100 thousand (CPPI) over 5			Government of BC and the Canadian Petroleum Products Institute

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		energy and valuable chemical by-products from softwood residue.	yrs			
	Green Power Procurement and Renewables	Power purchase from IPP –from hydro and biomass				Government of British Columbia
	Power Smart	Demand side energy efficiency				BC Hydro
	Resource Smart	BC Hydro energy efficiency				BC Hydro
	Renewable Energy Technology	Demonstration renewable energy technologies in thermal and electricity generation applications				Government of British Columbia
New Brunswick	VCR Progress Report					
	Co-generation Policy	Encourages purchase of electricity by the utility upon industry modernizing or expansion				Department of Natural Resources and Industry
	Energy Efficiency Standards for Equipment	Improve efficiency of selected products				Department of Natural Resources and Industry
Newfoundland	VCR Program					
Northwest Territories	VCR Progress Report					
	Energy Conservation Capital Program	Grants to support conservation projects				Arctic Energy Alliance
	Arctic Energy Alliance	Help reduce cost and				NWT Power Corp., NWT

Jurisdiction	Program	Goals	Budget	Delivery mechanism	Conditions	Financing
		environmental impacts of energy				Housing Corp., NWT Association of Municipalities, NWT Public Utilities Board
Nova Scotia	VCR Action Plan					
	Energy-Efficient Appliances Act and Regulations	Increase efficiency of energy-using equipment available				Nova Scotia Natural Resources
	Green Energy and Renewables	Establish green power purchase program and increase access for green energy				Gov. of Nova Scotia, Nova Scotia Power Inc.
Ontario	Government VCR Action Plan					
	Measures to Reduce Emissions					
	Climate Change Solutions					
	Energy Competition Act	Encourages investment in clean power generation				Ministry of Energy, Science and Technology
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Quebec	Climate Change Action					

Jurisdiction	Program	Goals	Budget	Delivery mechanism	Conditions	Financing
	Plan					
	EcoGESte Program	Record voluntary actions on Climate Change				Department of Environment, Department of Natural Resources
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